# PARKLANE COUNTRY HOMES
## SOIL EXPLORATION REPORT

WAIHEE, OAHU, HAWAII
TAX MAP KEY: 4-7-06: 20

To:
GRAY, RHEE AND ASSOCIATES, INC.

**WALTER LUM ASSOCIATES, INC.**
CIVIL, STRUCTURAL, SOILS ENGINEERS

JANUARY 4, 1974

**WALTER LUM ASSOCIATES, INC.**
CIVIL, STRUCTURAL, SOILS ENGINEERS

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January 4, 1974

GRAY, RHEE AND ASSOCIATES, INC.
116 South King Street, Suite 508
Honolulu, Hawaii 96813

Gentlemen:

Subject: Parklane Country Homes
Soil Exploration Report
(for site grading for
residential development)
Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

Transmitted herewith is our soil exploration report for site grading for residential development purposes for the proposed Parklane Country Homes at Waihee, Oahu, Hawaii.

This report includes a Boring Location Sketch, boring logs, laboratory test results, recommendations and limitations.

Respectfully submitted,

WALTER LUM ASSOCIATES, INC.

By Ezra Koike
Ezra Koike

CM/EK:ms

# C O N T E N T S

PARKLANE COUNTRY HOMES
SOIL EXPLORATION REPORT

WAIHEE, OAHU, HAWAII
TAX MAP KEY: 4-7-06: 20

## SCOPE OF EXPLORATION

The purpose of this exploration was to evaluate general soil conditions for site grading for residential development for the proposed Parklane Country Homes at Waihee, Oahu, Hawaii.

This report includes field explorations, laboratory tests, general site grading and foundation design recommendations and limitations.

## FIELD EXPLORATION

Seven exploratory borings and 27 probings were made at the site at the approximate locations shown on the Boring Location Sketch. Borings were made with 3 and 4-in. diameter augers using finger type bits and drag bits.

Soil samples were recovered with 2 and 3-in. diameter thin-wall tubes and a 2-in. standard split spoon sampler driven with a 140-lb hammer falling 30 inches.

The probings were made with a 2-in. diameter blunt point attached to A-rods and driven with a 140-lb hammer falling 30 inches.

Field vane shear tests were performed with a vane 2 in. in diameter and 4 in. long.

Also attached are logs of borings and probings made for the soil reconnaissance report, "Proposed Subdivision (10± Acres)," dated December 4, 1970 and updated report, "Proposed PD-Housing Parklane Country Homes," dated March 1, 1973.

## LABORATORY TESTS

Laboratory tests included: natural water content and density, unconfined compression, laboratory vane shear, Atterberg limit, grain-size analysis, specific gravity, consolidation and CBR.

A summary of the laboratory test results is given in Tables IA and IB.

## GEOLOGIC AND SOIL DESCRIPTIONS BY OTHERS

From a review of geologic literature and the U. S. Soil Conservation Service maps of the area, the soils generally described by others are as follows:

Stearns, H. T. and U. S. Geologic Survey, "Geologic and Topographic Map of Island of Oahu," 1938:

Pa - consolidated deposits, chiefly older alluvium.

U. S. Soil Conservation Service, "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii," August 1972:

Lolekaa silty clay, 3 to 8 percent slopes (LoB)

Unified Soil Classification - MH

Tropaquepts - (TR) poorly drained soils that are periodically flooded by irrigation in order to grow crops that thrive on water.

## SOIL CLASSIFICATION SYSTEM

Soil samples were visually observed and subjected to appropriate tests in the laboratory. Based on visual observations and laboratory tests, the soil descriptions given on the boring logs are generally made in accordance with the "Unified Soil Classification System."

## GENERAL SITE CONDITIONS

### Site Location

The project site is located at the intersection of Waihee Road and Ahilama Road in Waihee, Oahu, Hawaii. The Kahaluu Elementary School is located east of the site.

### Annual Rainfall

The average annual rainfall at the site varies from about 50 to 75 inches.

Topography

In general, about 2/3 of the site is low lying marsh land and about 1/3 is higher ground or a terrace. The terrace is generally located along Waihee Road and Ahilama Road.

The terrace area is covered with grass, brush, trees and boulders.

The low lying marsh area is covered with tall grass. Water was noted at or near the surface in most of the marsh area.

The site is generally flat except at the boundary between the terrace and marsh areas. Slopes up to about 2 horizontal to 1 vertical and as high as 30 ft were noted at the northwesterly corner of the site.

An auwai crosses the northern portion of the site along Waihee Road.

## INTERPRETATION OF SOIL CONDITIONS

From the field exploration and laboratory test results, the soils encountered in the borings may be generally approximated as follows:

Higher Area (Terrace)

Stiff clayey silts and silty clays (MH soils) with some decomposed rock to 16.5 ft, the depths drilled.

Lower Area (Marsh)

A surface layer, 8 to 23 ft, of soft to loose organic clays and silts with sands and gravels underlain by a mixture of medium to stiff silty clays and clayey silts with sands and gravels to 26 ft, the maximum depth drilled.

Water was noted in the lower area during the field exploration from the ground surface to about 1 ft above the ground surface. Water was not noted in the borings on the higher terrace area during the field explorations.

Variations to the above soil conditions are to be expected in localized areas. For more detailed descriptions of soils encountered in the borings, refer to the boring logs.

## DISCUSSION AND RECOMMENDATIONS

In general, the present plan is to cut portions of the higher terrace area and fill most of the lower marsh area. Cuts up to about 4 ft and fills up to about 10 ft are contemplated. Localized fills up to about 15 ft are planned at the northwesterly access into the site.

In the areas underlain by soft deposits, the fills may settle from several inches to 2 ft or more depending upon the thicknesses of the soft deposits and weights of the fills.

Surface and subdrainage systems will be an important part of the site grading design, particularly in the marshy areas.

Before the start of grading work, well defined drainage paths or ditches should be cut thru the lower section to lower the water as much as practicable.

Spring or seepage zones, if encountered, should be located and drainage adjustments made in the field.

After drainage of the site, site grading, particularly the construction of fills, should be done as soon as practicable to allow settlements to occur and allow the site to adjust to the new load conditions.

In the lower area, a fairly well-graded granular material should be used to construct the lower portions of the fill to form a working platform.

General fills over the working platform and in the upper terrace areas should be constructed with selected soils in thin, level compacted layers.

Settlement gages should be installed and periodic level readings taken to monitor the progressive movements. Building construction should be delayed as long as practicable and preferably until settlement gages indicate minimal rates of settlements. In general, the fill should be allowed to consolidate for about 6 months before building construction on top of the fill.

If practicable, the site may be surcharged to accelerate settlements and minimize future settlements.

A generous allowance for earthwork quantities should be made for the removal of the surface grass and organic soils, and for the consolidation of the soft layers.

Site Grading

Drainage of the site is important before site development. Grading work should be done in accordance with the Revised Ordinances of Honolulu, 1969 As Amended and as discussed below.

Drainage of the site, particularly the lower area, may proceed first by cutting trenches thru the marsh to allow a free flow of water to the proposed ponds.

Vegetation and soft peaty mud should be removed and replaced with granular material up to about 2 to 3 ft above water level to form a working platform.

The open drainage ditches may be replaced with perforated subdrains backfilled with filter rock. The filter rock should be well graded from 1-1/2 to 0 in. with greater than 90% passing the 1-in. sieve and with less than 10% passing the No. 200 sieve. The granular material for the working platform should be fairly well graded (6-in. minus sizes) with less than 15% passing the No. 200 sieve for that portion passing the 1-1/2-in. sieve.

After placement, the working platform should be proofrolled and soft spots that are detected should be excavated and reconstructed.

To minimize heaves, fills over the lower area should be laid down in thin lifts and at relatively slow rates.

Fills above the working platform and in the upper terrace area may be constructed with selected borrow soils generally less than 6-in. size and with the plasticity index less than about 20.

The preliminary plans indicate a minimum of fill along the southerly boundary of the site. In general, fills should be placed to raise the ground surface about 4 ft or more above the natural ground water level.

In general, fills above the working platform should be laid in 6-in. compacted layers to 90% of the maximum density determined by the AASHO T-180-73I test method. In roadway areas, the top 2 ft of fill should be compacted to 95% of the maximum density.

Fills should be constructed in approximately level layers starting at the lower end and working upward. Where fills are made on sloping areas steeper than about 5 horizontal to 1 vertical, the ground at the toe of the fill should be benched to a generally level condition. As the fill is brought up it should

continually be keyed into stiff natural ground by cutting steps into the slopes and compacting the fill into these steps.

Slopes

In general, cut and fill slopes of 2 horizontal to 1 vertical or flatter should be used.

To minimize erosion, the runoff from rainstorms should be diverted by berms or ditches away from slopes whenever practicable.

The surface of fill slopes should be compacted by cat-tracking or with a sheepsfoot roller.

Slope planting is recommended on cut and fill slopes to minimize erosion.

For protection against erosion during construction, it is recommended that runoff water from rainstorms be controlled by berms or other approved methods.

Building Foundation

For light residential structures, several types of foundations may be considered:

Post and beam construction

Where the soft deposits are less than 10 ft thick and construction is delayed sufficiently to allow much of the settlement to take place, post and beam foundations may be used on compacted fill or stiff natural ground say at the westerly 1/3 of the site. Bearing values of 500 p.s.f. may be used on spread footings on the compacted surface crust.

Similarly, spread footing foundations may be used for the deeper soft deposits if the site can be surcharged and a waiting period of about a year or more is feasible.

Slab on ground

For structures at the northeasterly corner of the site on top of the terrace, slab-on-ground construction may be used provided that the structures are not closer than 20 ft from the tops of slopes and the strength of the soil increases with depth.

Bearing values of 2000 p.s.f. may be used under spread footing foundations.

Small pile foundations

Where the soft underlying deposits are greater than 10 ft or where it is not practicable to wait until surface settlements become nil after consolidation of the underlying layers, small diameter wood or pipe piles should be considered.

Four-inch diameter pipe piles may be considered for pile foundations. The piles should generally penetrate about 5 ft or more into firm ground below the soft muck. Bearing values of about 5000 lbs per pipe may be considered. Pile lengths will probably vary from about 10 to 30 ft or more.

Foundation partly on terrace and partly over slopes

Soils along the tops of slopes tend to creep downhill. For foundations within 20 ft of the top of the slope, small pile foundations well tied together should be considered.

Foundations partly on slopes and partly on fills underlain by soft deposits

Small pile foundations are recommended wherever the building foundations will be partly on the toe of a slope and partly on fill underlain by soft soils. The foundation piles should

be well tied together because of the downhill creep of the soils at the toes of slopes.

10 x 10 prestressed concrete piles

If the small piles recommended do not seem feasible in some areas, particularly for the longer piles, 10 x 10 prestressed concrete piles may be used. The piles should be driven with a hammer delivering about 9,000 ft-lbs of energy and driven to a penetration resistance of about 50 blows per foot for the last 2 feet. Allowable bearing values of about 25 tons per pile may be used.

Good surface drainage away from the foundations of the proposed structures should be maintained and the site should be graded to prevent the ponding of water.

Sidewalks

Due to the consolidation of the soft layers in the marsh area, sidewalks and walls may weave and require maintenance, particularly where non-pile supported structures connect to pile supported structures.

Retaining Walls

For this site, it would be preferable to use flexible type walls, such as crib walls, reinforced earth, gabions, etc., because of the anticipated differential settlements. In any event, some maintenance of the walls should be anticipated.

Retaining walls over the soft ground should be designed with care.

Walls partly over the upper terrace and partly over the filled marsh should be designed to tolerate some differential movements, particularly along the transition areas from cut to fill.

The bottom of walls should generally rest on stiff natural ground or compacted fill. Soft or loose pockets at the bottom of wall excavations should be removed and replaced with select soils compacted in thin lifts.

Subdrains should be placed behind the walls below the footing level and should be daylighted at low points.

Fairly well-graded granular material or selected granular material should be used for backfilling against the wall.

Bearing values of about 2000 p.s.f. may be used for retaining wall foundations resting on stiff natural ground or compacted select fill. The bearing values may be somewhat increased for the toe pressures.

For lateral earth pressures, an equivalent fluid pressure of about 45 p.c.f. plus allowances for vehicular loads and sloping backfill loads where applicable may be used. The center of pressure should be considered to act somewhat above the lower third of the triangular fluid pressure diagram, assuming that subdrainage and drainage of the backfill are provided.

Slopes above walls should be 2 horizontal to 1 vertical or flatter.

Utilities

Underground utilities should be installed after the fills are constructed. Utilities should be constructed with flexible joints.

Gravity lines should generally be designed as steep as practicable to allow for flow should some localized sags occur.

Roadways

Roadway pavement construction in the lower area should be delayed until the settlement readings indicate minor rates of settlement.

In general, for light automobile traffic and drained subgrade conditions, an estimate of the roadway pavement thickness may be as follows:

1. Wearing course - 2-in. asphaltic concrete.
2. Base course - 6-in. base course.
3. Subbase course - 6-in. select borrow.
4. Borrow - 6-in. borrow over a prepared subgrade.

The need for a subbase and borrow will depend upon the materials used to construct the fills at the site. This section of the pavement will depend greatly on field conditions.

Local adjustments regarding subbase requirements can be made in the field in accordance with the design standards of the City and County of Honolulu as the various soil conditions are encountered at subgrade levels.

It is recommended that subgrades be compacted and shaped to drain. To avoid the ponding of water and softening of the subgrade at low points, weep holes should be placed at subgrade levels thru the walls of the catch basins which are placed in these low areas.

Unforeseen Conditions

Because of the variability of soil deposits, site improvements, designs and construction techniques, conditions may be encountered that cannot be foreseen with even the most exhaustive studies of site and project conditions. These unforeseen conditions should be recognized when encountered and then evaluated so that the designs or the construction methods may be modified accordingly, if necessary.

Unforeseen or undetected conditions such as soft spots, existing utility trenches, structure foundations, voids or cavities, boulders, expansive soil pockets or seepage water, etc., may occur in localized areas and will have to be adjusted and corrected in the field as they are detected.

Site Regrading

After mass grading work is done and cuts and fills are made according to the grading plans, regrading at some future date should be avoided unless done under the guidance of a soils engineer.

# PROPOSED SPECIFICATION FOR EARTHWORK

# PARKLANE COUNTRY HOMES

## General Description

This item shall consist of clearing, grubbing, preparing of land to be filled, excavating and filling of the land, spreading, compacting and testing of the fill, and subsidiary work for grading the site.

## Clearing, Grubbing and Preparing Areas to be Filled

Trenches shall be cut thru the marsh to the proposed ponds to allow for drainage of the site.

Vegetation and soft peaty mud shall be removed and replaced with granular material up to about 2 to 3 ft above the water level to form a working platform.

The trenches shall be replaced with perforated subdrains backfilled with filter rock. The filter rock shall generally be well graded from 1-1/2 to 0-in. with greater than 90% passing the 1-in. sieve and less than 10% passing the No. 200 sieve.

After placement, the working platform shall be proofrolled and soft spots that are detected shall be excavated and reconstructed.

Fills shall be constructed in approximately level layers starting at the lower end and working upward. Where fills are made on sloping areas steeper than 5 horizontal to 1 vertical, the ground at the toe of the fill shall be benched to a generally level condition. As the fill is brought up, it shall continually be keyed into stiff natural ground by cutting steps into the slopes and compacting the fill into these steps.

Materials

Granular fill material for the working platform shall be fairly well graded, generally less than 6-in. maximum size with less than 15% passing the No. 200 sieve for that portion passing the 1-1/2-in. sieve.

Fills above the working platform shall consist of select borrow soils generally less than 6-in. size and with the plasticity index less than 20. The soils shall contain no more than a trace of organic and deleterious matter.

Fill material placed in the top 2 ft of fills shall contain less than 30% gravel.

Placing, Spreading and Compacting Fill Material

The selected fill material shall be placed in level layers which, when compacted, shall not exceed 6 inches. Each layer shall be spread evenly and blade-mixed during the spreading to attain uniformity of material and water content within each layer.

Rocks or cobbles shall not be allowed to nest and voids between rocks shall be filled and compacted with small stones or earth.

When the water content of the fill material is well below the optimum for compacting purposes, water shall be added until the water content is near the optimum.

When the water content of the material is well above the optimum for compacting purposes, the fill material shall be aerated by blading or by other satisfactory methods until the water content is near the optimum.

After each layer has been placed, mixed and spread evenly, it shall be compacted to 90% of maximum density in accordance with AASHO Test

No. T-180-73I or other comparable density tests. For fills in roadway areas, the top 2 ft of fill shall be compacted to 95% of the maximum density. Compaction shall be with sheepsfoot rollers, multiple-wheel pneumatic-tired rollers or other acceptable rollers which shall be able to compact the fill to the specified density. Rolling shall be accomplished while the fill material is at the specified water content. The rolling of each layer shall be continuous over its entire area and the roller shall make sufficient passes to obtain the desired density.

Field density tests shall be made to get an indication of the compaction of the fill. Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several inches. Density readings shall be taken as often as necessary in the compacted material below the disturbed surface. When these readings indicate that the density of any layer of fill or portion thereof is below the required density, that layer or portion shall be reworked until the required density has been obtained.

The fill operation shall be continued in 6-in. compacted layers, as specified above, until the fill has been brought to the finished slopes and grades as shown on the accepted plans.

Excavation

Suitable material from excavation shall be used in the fill and unsuitable material from excavation shall be disposed of.

Unforeseen Conditions

If unforeseen or undetected soil conditions such as soft spots, existing utility trenches, structure foundations, voids or cavities, boulders, seepage water or expansive soil pockets, etc., are encountered, corrective measures shall be made in the field as they are detected.

Rainy Weather

Fill material shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests indicate that the water content and density are as previously specified.

# BORING LOGS

The stratification lines shown on each of the boring logs represent the approximate boundary between soil types and the transition may be gradual.

## Symbols

Symbols used generally are in accordance with the Unified Soil Classification System.

Where a parenthesis "(MH)" is used, the soil sample was classified by visual observation of the sample recovered.

Where no parenthesis "MH" is used, the soil sample was classified from either the Atterberg limit or sieve analysis test results.

PARKLANE COUNTRY LANES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 1 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date DEC. 26, 1973
Field Party SUZUKI, CHOW
Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"
Elev. 75'± * Datum —
Drill Bit T.C. DRAG

| | | | | |
|---|---|---|---|---|
| Water Level | NOT NOTICED | | | |
| Time | — | | | |
| Date | 12-26-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. (L.A.P.) | PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 75'± * | 0 | | | | | | | | |
| (MH) | MEDIUM DARK MOTTLED BROWN CLAYEY SILT W/ROOTS | | | 1-A | - | 42 | - | - | - | |
| (MH) | MEDIUM MOTTLED BROWN CLAYEY SILT W/ DECOMPOSED ROCK | 5 | | 1-B | - | 48 | - | - | - | |
| | | | | 1-C | - | 56 | - | - | - | |
| | MEDIUM TO STIFF MOTTLED BROWN CLAYEY SILT & DECOMPOSED ROCK W/ FRACTURED BLUE-GRAY ROCK | 10 | | 1-D | - | 31 | - | - | - | 25/0.5' 10/0.5' |
| | | 15 | | 1-E | - | 59<br>13 | - | - | - | 53/0.5' 11/0.5' |
| | DENSE, FRACTURED BLUE-GRAY, ROCK W/ OLIVE-GREEN CRYSTALS | | | | | | | | | |
| | END OF BORING @ 16.5' 12-26-73 | | | | | | | | | |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2"SS - 2" STANDARD SPLIT SPOON
3"S - 3" O.D. THIN WALL TUBE

BORING NO. 2 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date DEC. 22, 1973
Field Party SUZUKI, OSHIRO
Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 4"
Elev. 70'± * Datum —
Drill Bit T.C. DRAG

| | | | | |
|---|---|---|---|---|
| Water Level | 1.2'± | | | |
| Time | 11:00AM | | | |
| Date | 12-21-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. (LAB.) | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 3" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 70'± * | 0 | | | | | | | | | |
| | WATER 12-22-73 | | 3"S | 2-A | 90 | 93 | 46 | - | 320<br>400<br>360 | | PUSH/1.5' |
| (OH) | SOFT, GRAY ORGANIC CLAYS & SILTS W/SOME ROOTS | 5 | 3"S | 2-B | 94 | 90 | 50 | - | 360<br>400<br>440 | | PUSH/1.5' |
| (MH) | MEDIUM MOTTLED GRAY BROWN SILTY CLAY W/GRAVEL, PEBBLES & SAND | 10 | 2"SS | 2-C | - | 64 | - | - | - | | |
| (MH-CH) | MEDIUM-SOFT, MOTTLED GRAY SILTY CLAY W/TRACES OF DECOMPOSED ROCK & GRAVEL | 15 | 2"SS | 2-D | - | 84 | - | - | - | | |
| (MH) | MEDIUM-STIFF MOTTLED GRAY REDDISH BROWN SILTY CLAY W/TRACES OF DECOMPOSED ROCK | 20 | 2"SS | 2-E | - | 70 | - | - | - | | |
| | END OF BORING @ 21.5' 12-22-73 | | | | | | | | | | |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2"SS - 2" STANDARD SPLIT SPOON
3" S - 3" O.D. THIN WALL TUBE

BORING NO. 3 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date DEC. 7 & 11, 1973
Field Party MEYER, KAU, OMORI
Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 4"
Elev. 64'± * Datum —
Drill Bit T.C. DRAG

| Water Level | +0.3' | +0.2' | | | |
|---|---|---|---|---|---|
| Time | — | — | | | |
| Date | 12-7-73 | 12-11-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-11-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. (LAB.) | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | 3" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 64'± * | 0 | +0.2' | | | | | | | | | |
| OH | SOFT, GRAY ORGANIC CLAYS & SILTS | | 3"S | | 3-A | 86 | 74 | 49 | — | — | | HAND PUSH 2.0' |
| | | 5 | | | | LL= 93 | 91 104 | PL= | 45 | 220 240 | | |
| (GM) | GRAY, SILTY GRAVEL W/SAND (ORGANIC) | | 3"S | | 3-B | | 99 66 | | — | 260 | | HAND PUSH 2.0' |
| (OH) | SOFT, GRAY ORGANIC CLAYS & SILTS | | | | | | | | | | | |
| | | 10 | | | | | 123 | | | | 1/1.0' | |
| (SM) | LOOSE, GRAY ORGANIC SILTY SAND W/TRACES OF GRAVEL | | 2"SS | | 3-C | — | 75 | — | — | — | 2/0.5 | |
| (OH) | SOFT, GRAY ORGANIC CLAYS & SILTS | 15 | 2"SS | | 3-D | — | 72 | — | — | — | 1/1.0' 1/0.5 | |
| (SM) | LOOSE GRAY ORGANIC SILTY SAND W/GRAVEL | 20 | 2"SS | | 3-E | — | 60 | — | — | — | 2/1.0' | |
| (GM) | GRAY ORGANIC SILTY GRAVEL W/SAND | 25 | 2"SS | | 3-F | — | 51 | — | — | — | | |
| | END OF BORING @ 27' 12-11-73 | | | | | | | | | | | |

NOTE:
LL: LIQUID LIMIT
PL: PLASTIC LIMIT

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

BORING NO. 4 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date NOV. 27, 1973
Field Party MEYER, KAU
Type of Boring AUGER (VERSA DRILL) Diam. 4"
Elev. 66'± * Datum —
Drill Bit T.C. DRAG

HAMMER:
Weight 140#
Drop 30"
SAMPLER: 2"SS-2" O.D. THIN WALL TUBE
2"SS-2" STANDARD SPLIT SPOON

| Water Level | | | | |
|---|---|---|---|---|
| Time | — | | | |
| Date | 11-27-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. (LAB.) | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 2" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 66'± * | 0 | | | | | | | | | |
| (MH) | STIFF, LIGHT BROWN SILTY CLAY | | 2"SS | 4-A | – | 56 | – | – | – | | |
| | | | 2"SS | 4-B | – | 55 | – | – | – | | |
| | | 5 | | | | | | | | | |
| (MH) | STIFF LIGHT BROWN & BROWN CLAYEY SILT | | 2"S | 4-C | 101 | 55 | 65 | 3340 | – | | 5/0.5' 8/0.5' |
| | | 10 | | | | | | | | | |
| (MH) | STIFF LIGHT MOTTLED BROWN CLAYEY SILT | | 2"SS | 4-D | – | 60 | – | – | – | | |
| | | 15 | | | | | | | | | |
| | BROWN DECOMPOSED ROCK | | 2"S | 4-E | 104 | 62<br>61<br>52 | – | – | – | | 5/0.5' 8/0.5' 8/0.5' |
| | END OF BORING @ 16.5' 11-27-73 | | | | | | | | | | |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

BORING NO. 5 Sheet No. ____ of ____
Driller W. LUM ASSOC. INC. Date DEC. 13, 1973
Field Party MEYER, KAU, OMORI
Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 4"
Elev. 70'± * Datum —
Drill Bit T.C. DRAG

HAMMER: Weight 140# Drop 30"
SAMPLER: 2" SS - 2" STANDARD SPLIT SPOON; 3" S - 3" O.D. THIN WALL TUBE

| Water Level | | | | |
|---|---|---|---|---|
| Time | — | | | |
| Date | 12-13-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. (LAB.) | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 3" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 70'± * | 0 | +0.3' | | | | | | | | |
| OH | SOFT, GRAY ORGANIC CLAYS & SILTS | | 3"S | S-A | LL= 98 | 66<br>62<br>68 | PL= | 46 | 380<br>720<br>640 | | HAND PUSH 1.0' |
| (OH) | SOFT, GRAY & BROWN ORGANIC SANDY SILT W/ GRAVEL | 5 | 2"SS | S-B | – | 73 | – | – | – | 1/1.0'<br>1/0.5' | |
| (GM) | LOOSE, GRAY SILTY SAND & GRAVEL | 10 | 2"SS | S-C | – | 33 | – | – | – | | |
| (OH) | SOFT, GRAY ORGANIC CLAYS & SILTS W/ SAND | 15 | 2"SS | S-D | – | 76<br>39 | – | – | – | | |
| (GM) | LOOSE GRAY SILTY SAND & GRAVEL | | | | | | | | | | |
| (SM) | LOOSE, GRAY, ORGANIC SILTY SAND W/ SOME GRAY, DECOMPOSED ROCK | 20 | 2"SS | S-E | – | 61 | – | – | – | | |
| | GRAY & LIGHT BROWN DECOMPOSED LAVA ROCK, SILTY GRAVEL W/ SAND | 25 | 2"SS | S-F | – | 25 | – | – | – | | |
| | END OF BORING @ 26.5' 12-13-73 | | | | | | | | | | |

NOTE:
LL= LIQUID LIMIT
PL= PLASTIC LIMIT

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" SS - 2" STANDARD SPLIT SPOON
3" S - 3" O.D. THIN WALL TUBE

BORING NO. 6 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: DEC. 3, 1973
Field Party: MEYER, KAU, OMORI
Type of Boring: AUGER (MOBILE MINUTEMAN) Diam.: 4"
Elev.: 58'± * Datum: —
Drill Bit: T.C. DRAG

| | | | | |
|---|---|---|---|---|
| Water Level | +1.3' | | | |
| Time | — | | | |
| Date | 12-3-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-3-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. (LAB.) | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 3" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.: 58'± * | 0 | | +1.3' | | | | | | | | |
| | GRASS | | | | | | | | | | | |
| OH-PT | SOFT, GRAY ORGANIC CLAYS & SILTS W/ POCKETS OF PEAT | 5 | 3"S | | G-A | – | 110<br>85<br>68 | – | – | – | | HAND PUSH 1.5' |
| | | | 3"S | | G-B | – | 201<br>322<br>77 | –<br>LL= 139<br>PL= 56 | – | 120<br>100<br>100 | | HAND PUSH 1.5' |
| OH | LOOSE, GRAY ORGANIC SANDY SILT | 10 | | | | | | LL= 72<br>PL= 42 | | 140 | | |
| | | | 3"S | | G-C | 96 | 79<br>78 | 54 | – | 140<br>150<br>180<br>200 | | HAND PUSH 1.5' |
| SM | LOOSE, GRAY BROWN SILTY SAND (ORGANIC?) | | | | | | | | | | | |
| (OH) | SOFT, GRAY ORGANIC CLAYS & SILTS W/ SAND | 15 | 2"SS | | G-D | – | 61 | – | – | – | 2/1.0' | |
| OH | SOFT, GRAY ORGANIC CLAYS & SILTS | 20 | 3"S | | G-E | 108 | 79 | 61<br>LL= 79<br>PL= 40 | – | 180<br>200<br>180<br>120<br>100 | | HAND PUSH 1.0'<br>3/0.5' |
| | GRAY BROWN DECOMPOSED ROCK W/ CLAYEY SILT | 25 | 2"SS | | G-F | – | 20 | – | – | – | 15/0.5'<br>30/0.1' | HAMMER BOUNCES |
| | END OF BORING @ 26.1' 12-3-73 | | | | | | | | | | | |

NOTE:
LL= LIQUID LIMIT
PL= PLASTIC LIMIT

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" S-2" O.D. THIN WALL TUBE
2" SS-2" STANDARD SPLIT SPOON

BORING NO. 7 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date DEC. 28, 1973
Field Party MEYER, OMORI, CHOW
Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"
Elev. 66'± * Datum —
Drill Bit T.C. DRAG

| Water Level | | | | |
|---|---|---|---|---|
| Time | — | | | |
| Date | 12-28-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. (LAB.) | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 2" O.D. THIN WALL TUBE SAMPLER BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 66'± * | 0 | | | | | | | | | |
| (MH) | STIFF, BROWN, RED, GRAY & LIGHT BROWN SILTY CLAY W/ ROOTS | | 2"SS | 7-A | — | 51 | — | — | — | | |
| (MH) | STIFF, BROWN & TAN CLAYEY SILT W/ DECOMPOSED ROCK | | 2"SS | 7-B | — | 58 | — | — | — | | |
| (MH-CH) | STIFF, BROWN SILTY CLAY | 5 | 2"S | 7-C | 110 | 54 | 71 | 4450 | — | | 6/0.5' 10/0.5' |
| (MH) | MEDIUM TO STIFF MOTTLED BROWN CLAYEY SILT W/ DECOMPOSED ROCK | 10 | 2"SS | 7-D | — | 68<br>69 | — | — | — | 2/0.5'<br>6/0.5' | |
| | LIGHT TAN BROWN & BLACK DECOMPOSED ROCK | 15 | 2"SS | 7-E | 106 | 63 | 65 | — | — | | |
| (MH) | BROWN, BLACK & RED CLAYEY SILT W/ DECOMPOSED ROCK | 20 | 2"SS | 7-F | — | 58 | — | — | — | | |
| | END OF BORING @ 21.5' 12-28-73 | | | | | | | | | | |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING NO. 1 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: DEC. 27, 1973

Field Party: SUZUKI, SHIGENAGA, CHON

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 70'± * Datum: —

Drill Bit: ____

| Water Level | | | | |
|---|---|---|---|---|
| NOT MEASURED | | | | |
| Time | — | | | |
| Date | 12-27-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. |
|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 70'± * | 0 | | | | | | | |
| | | 5 | | | | | | | |
| | | 10 | | | | | | | |
| | | 15 | | | | | | | |
| | END OF PENETRATION @ 20' 12-27-73 | 20 | | | | | | | |

PENETRATION DATA

~~Standard~~ CONTINUOUS Penetration Test

N (Blows per foot) 0 10 20 30 40

5/0.5'
14/0.5'
10/0.5'
27/0.5'

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.** [redacted] 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROBING

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

~~BORING~~ NO. 2 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date DEC. 27, 1973

Field Party SUZUKI, SHIGENAGA, CHOW

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 68'± * Datum —

Drill Bit ____

| | | | | | |
|---|---|---|---|---|---|
| Water Level NOT MEASURED | | | | | |
| Time — | | | | | |
| Date 12-27-73 | | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. |
|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 68'± * | 0 | | | | | | | |
| | | 5 | | | | | | | |
| | | 10 | | | | | | | |
| | | 15 | | | | | | | |
| | END OF PENETRATION @ 19.5' 12-27-73 | 20 | | | | | | | |

PENETRATION DATA
~~Standard~~ CONTINUOUS Penetration Test
N (Blows per foot) 0 10 20 30 40

12/0.5'

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY LANES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING ~~BORING~~ NO. 3 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date DEC. 20, 1973

Field Party SUZUKI, KAKU, OMORI

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 71'± * Datum —

Drill Bit ____

| Water Level | | | | |
|---|---|---|---|---|
| Time | — | | | |
| Date | 12-20-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 71'± * | 0 | | | | | | | | |
| | | 5 | | | | | | | | 1/1.0' 1/0.5' 1/1.0' 1/0.5' 2/1.0' 3/1.0' |
| | | 10 | | | | | | | | |
| | | 15 | | | | | | | | |
| | | 20 | | | | | | | | |
| | | 25 | | | | | | | | |
| | END OF PENETRATION @ 32.5' 12-20-73 | 30 | | | | | | | | 10/0.5' |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING NO. 4 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: DEC. 27, 1973

Field Party: SUZUKI, SHIGENAGA, CHOW

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

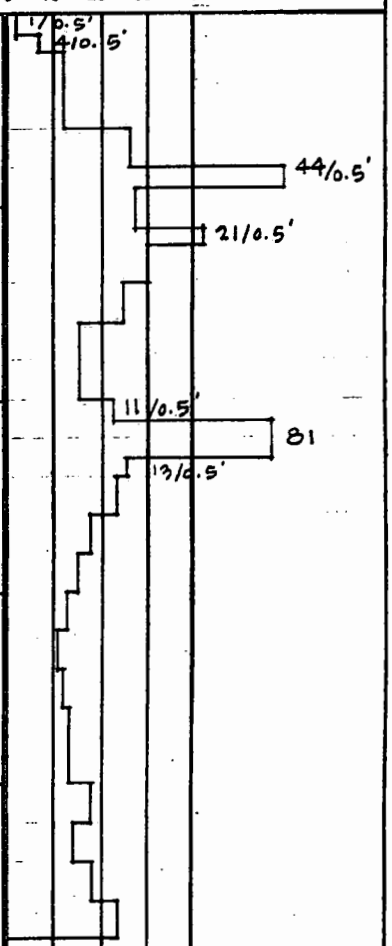
Elev.: 72'± * Datum: -

Drill Bit: ____

| | | | | | |
|---|---|---|---|---|---|
| Water Level | NOT MEASURED | | | | |
| Time | - | | | | |
| Date | 12-27-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Sheer P.S.F. |
|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 72'± * | 0 | | | | | | | |
| | | 5 | | | | | | | |
| | | 10 | | | | | | | |
| | | 15 | | | | | | | |
| | | 20 | | | | | | | |
| | END OF PENETRATION @ 24' 12-27-73 | | | | | | | | |

PENETRATION DATA
CONTINUOUS Penetration Test
N (Blows per foot) 0 10 20 30 40




*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROBING ~~BORING~~ NO. 5 Sheet No. _____ of _____

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

Driller W. LUM ASSOC., INC. Date DEC. 20, 1973

Field Party SUZUKI, OMORI, KAKU

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 71'± * Datum —

Drill Bit _____

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

| | | | |
|---|---|---|---|
| Water Level | NOT MEASURED | | |
| Time | — | | |
| Date | 12-20-73 | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 71'± * | 0 | | | | | | | | 1/1.0' |
| | | | | | | | | | | 1/1.5' |
| | | | | | | | | | | 1/1.0' |
| | | 5 | | | | | | | | 4/0.5' |
| | | 10 | | | | | | | | |
| | | 15 | | | | | | | | |
| | | 20 | | | | | | | | |
| | | 25 | | | | | | | | |
| | | 30 | | | | | | | | 48/0.5' |

END OF PENETRATION @ 30.5'
12-20-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING
~~BORING~~ NO. 6 Sheet No. ____ of ____
Driller W. LUM ASSOC., INC. Date DEC. 22, 1973
Field Party SUZUKI, OSHIRO
Type of Boring CONTINUOUS PENETRATION Diam. 2"
Elev. 66'± * Datum -
Drill Bit

| Water Level | | | | |
|---|---|---|---|---|
| NOT MEASURED | | | | |
| Time - | | | | |
| Date 12-22-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F.(FIELD) | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 66'± * | 0 | | | | | | | | |
| | | | | | | | | | 200 | 1/2.5' 1/1.5' |
| | | 5 | | | | | | | | |
| | | 10 | | | | | | | | 6/0.5' 16/0.5' |
| | | 15 | | | | | | | | 5/0.5' 11/0.5' |
| | | 20 | | | | | | | | 16/0.5' |
| | END OF PENETRATION @ 20.5' 12-22-73 | | | | | | | | | |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM BLUNT POINT

PROBING
~~BORING~~ NO. 7 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: DEC. 4, 1973

Field Party: MEYER, KAU, OMORI

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 61'± * Datum: —

Drill Bit: ____

| | | | | | |
|---|---|---|---|---|---|
| Water Level | +0.2' | | | | |
| Time | — | | | | |
| Date | 12-4-73 | | | | |

PARKLANE

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-4-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Sheer P.S.F. (FIELD) | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test — N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 61'± * | 0 | +0.2' | ▽ | | | | | | 426 | WT. OF HAMMER |
| | | 5 | | | | | | | | 946 | 1/0.5' 1/1.0' 1/0.5' |
| | | | | | | | | | | 1290 | 1/1.0' 1/0.5' 1/1.0' 1/0.5' 3/1.0' 2/1.0' |
| | | 10 | | | | | | | | | 3/0.5' 2/1.0' 4/0.5' |
| | | 15 | | | | | | | | | 2/1.0' 1/1.0' 1/1.5' 1/1.5' 1/0.5' 1/0.5' 3/1.0' |
| | | 20 | | | | | | | | | 2/0.5' |
| | | 25 | | | | | | | | | 65 |
| | | 30 | | | | | | | | | 52 |
| | | 35 | | | | | | | | | 13/0.5' 45 |

END OF PENETRATION @ 38'
12-4-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING ~~BORING~~ NO. 8 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: DEC. 20, 1973

Field Party: SUZUKI, KAKU, OMORI

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 68'± * Datum: -

Drill Bit: ____

| Water Level | | | | | |
|---|---|---|---|---|---|
| Time | - | | | | |
| Date | 12-20-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test — N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. 68'± * | 0 | | | | | | | | |
| | | 5 | | | | | | | | 1/1.0', 1/0.5', 1/1.0', 1/0.5', 1/1.0', 3/1.0' |
| | | 10 | | | | | | | | |
| | | 15 | | | | | | | | 4/0.5', 12/0.9' |
| | | 20 | | | | | | | | 5/0.5', 30/0.1' HAMMER BOUNCES |
| | END OF PENETRATION @ 23.6' 12-20-73 | | | | | | | | | |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:

Weight 140#

Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING ~~BORING~~ NO. 9 Sheet No. ____ of ____

Driller W. LUM ASSOC., INC. Date DEC. 7, 1973

Field Party MEYER, KAU, OMORI

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 64'± * Datum —

Drill Bit ____

| | | | | |
|---|---|---|---|---|
| Water Level | +0.3' | | | |
| Time | — | | | |
| Date | 12-7-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-7-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 64'± ▽ * | 0 | +0.3' | ▽ | | | | | | | WT. OF HAMMER/3.0' |
| | | 5 | | | | | | | | | 6/0.5' 2/0.5' |
| | | 10 | | | | | | | | | |
| | | 15 | | | | | | | | | |
| | | 20 | | | | | | | | | |
| | | 25 | | | | | | | | | |
| | | 30 | | | | | | | | | 44 50%/.4' |

END OF PENETRATION @ 31.4'
12-7-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING NO. 10 Sheet No. _____ of _____

Driller W. LUM ASSOC., INC. Date DEC. 7, 1973

Field Party METER, OMORI, KAU

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 62'± * Datum -

Drill Bit

| | | | | |
|---|---|---|---|---|
| Water Level | +0.2' | | | |
| Time | - | | | |
| Date | 12-7-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-7-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Sheer P.S.F. | PENETRATION DATA: Standard CONTINUOUS Penetration Test; N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 62'± * | 0 | +0.2' | | | | | | | | WT. OF RODS |
| | | 5 | | | | | | | | | 2/1.0' 3/0.5' 1/0.5' 1/1.0' 1/0.5' |
| | | 10 | | | | | | | | | 1/1.5' 2/1.0' 1/1.0' 1/0.5' |
| | | 15 | | | | | | | | | 2/1.0' |
| | | 20 | | | | | | | | | 1/0.5' 3/0.5' |
| | | 25 | | | | | | | | | 3/1.0' |
| | | 30 | | | | | | | | | 2/0.5' 24/0.5' 51 38/0.5' 40/0.1' |

END OF PENETRATION @ 30.6'
12-7-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

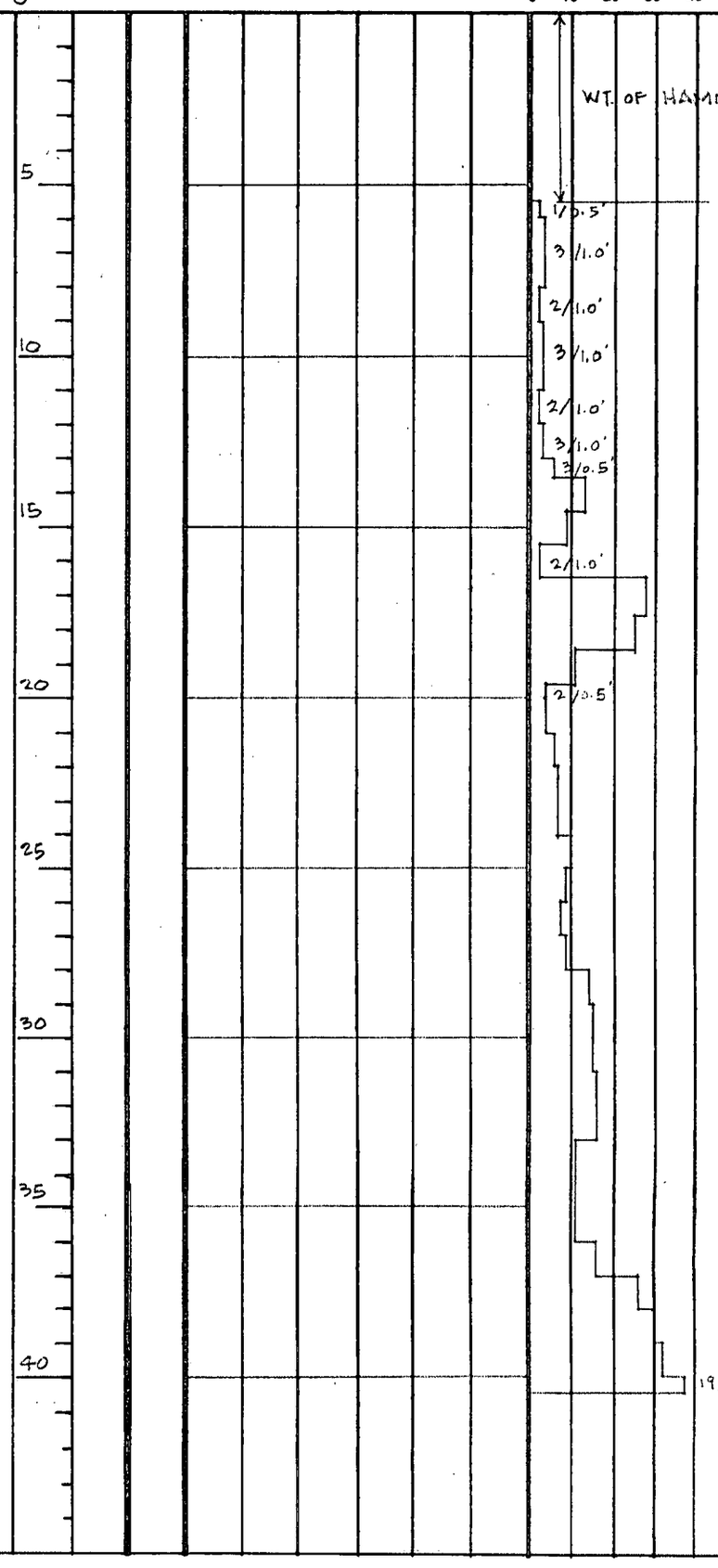
PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" DIAM. BLUNT POINT

PROBING ~~BORING~~ NO. 11 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: DEC. 4, 1973
Field Party: MEYER, KAU, OMORI
Type of Boring: CONTINUOUS PENETRATION Diam.: 2"
Elev.: 60'± Datum: –
Drill Bit: ____

| Water Level | | | | | |
|---|---|---|---|---|---|
| Time | – | | | | |
| Date | 12-4-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test — N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 60'± * | 0 | | | | | | | | |




END OF PENETRATION @ 40.5'
12-4-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" DIAM. BLUNT POINT

~~BORING~~ PROBING NO. 12 Sheet No. ____ of ____
Driller: W. LUM ASSOC. INC. Date: DEC. 4, 1973
Field Party: METER, KAU, OMORI
Type of Boring: CONTINUOUS PENETRATION Diam.: 2"
Elev.: 59'± * Datum: -
Drill Bit:

| | | | | | |
|---|---|---|---|---|---|
| Water Level | +0.1' | | | | |
| Time | - | | | | |
| Date | 12-4-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-4-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test, N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 59'± * | 0 | +0.1' | ▽ | | | | | | | |
| | | 5 | | | | | | | | | WT. OF HAMMER; 2/1.0'; 1/0.5'; 1/1.0' |
| | | 10 | | | | | | | | | WT. OF HAMMER; 2/1.0' |
| | | 15 | | | | | | | | | |
| | | 20 | | | | | | | | | 3/1.0' |
| | | 25 | | | | | | | | | 60; 60/0.3' |

END OF PENETRATION @ 27.8'
12-4-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING
~~BORING~~ NO. 13 Sheet No. _____ of _____
Driller W. LUM ASSOC. INC. Date NOV 30, 1973
Field Party MEYER, KAU, OMORI
Type of Boring CONTINUOUS PENETRATION Diam. 2"
Elev. 58'± * Datum —
Drill Bit _____

| | | | | | |
|---|---|---|---|---|---|
| Water Level | +.5' | | | | |
| Time | — | | | | |
| Date | 11-30-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 11-30-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test — N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 58'± | 0 | +0.5' | | | | | | | | 1/1.0' |
| | | | | | | | | | | | 2/1.0' |
| | | 5 | | | | | | | | | 3/1.0' |
| | | | | | | | | | | | 3/1.0' |
| | | 10 | | | | | | | | | |
| | | 15 | | | | | | | | | |
| | | 20 | | | | | | | | | |
| | | 25 | | | | | | | | | |
| | | 30 | | | | | | | | | |
| | | 35 | | | | | | | | | |
| | | 40 | | | | | | | | | 44 45 |

END OF PENETRATION @ 40'
11-30-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING
~~BORING~~ NO. 14 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: NOV. 27, 1973

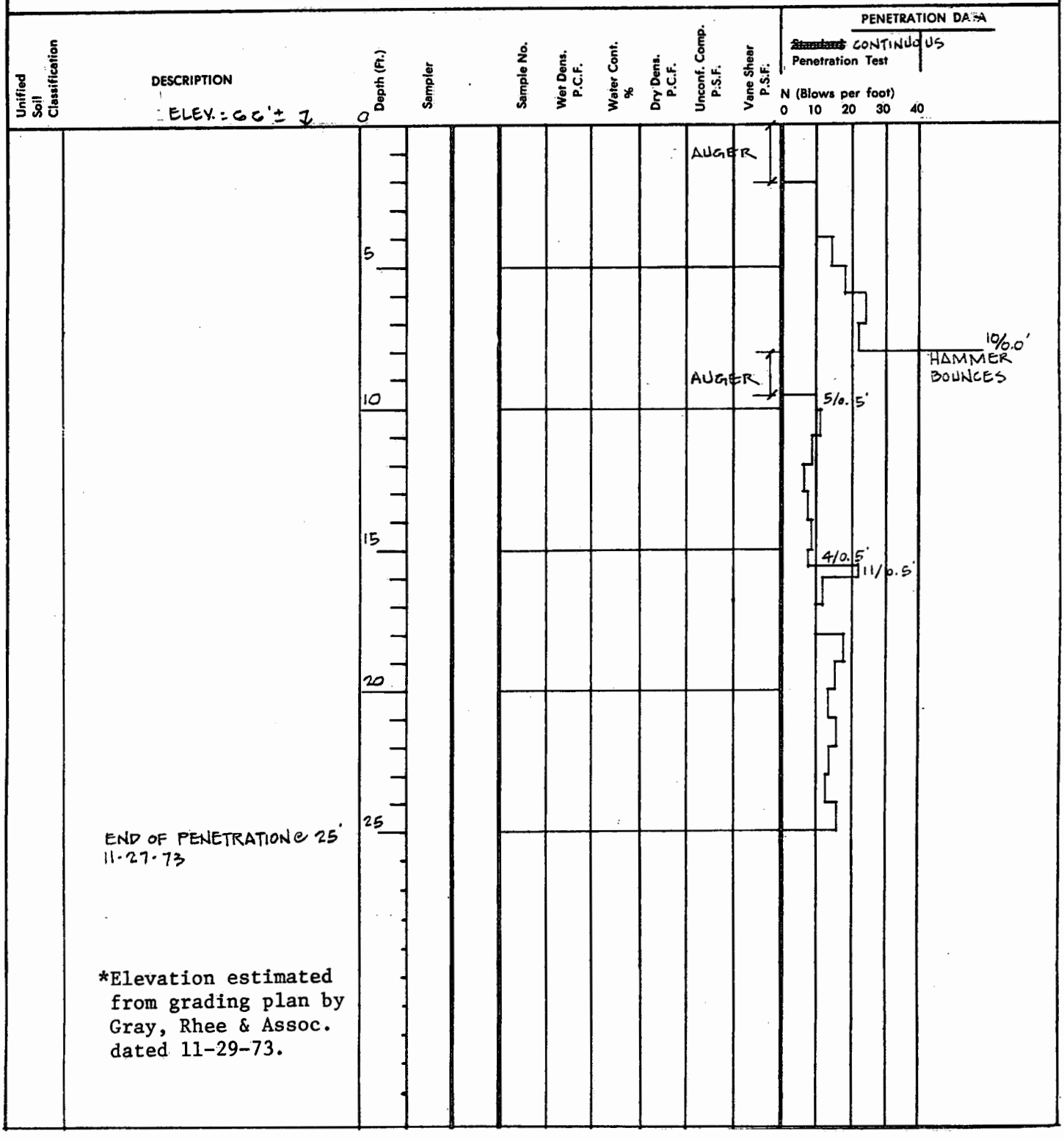
Field Party: METER, KAU

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 66'± * Datum: -

Drill Bit: ____

| Water Level | | | | |
|---|---|---|---|---|
| Time | - | | | |
| Date | 11-27-73 | | | |




*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROBING

BORING NO. 15 Sheet No. _____ of _____

PROJECT PARKLANE COUNTRY HOMES

Driller W. LUM ASSOC., INC. Date DEC. 19, 1973

LOCATION Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

Field Party SUZUKI, OMORI, KAN

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 69'± Datum -

Drill Bit

HAMMER:

Weight 140#

Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

| Water Level | | | | |
|---|---|---|---|---|
| Time | - | | | |
| Date | 12-19-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: CONTINUOUS Penetration Test, N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 69'± * | 0 | | | | | | | | |
| | | 5 | | | | | | | | 1/5.5' |
| | | 10 | | | | | | | | 1/5.0' |
| | | 15 | | | | | | | | 1/1.0' 2/1.0' 4/0.5' |
| | | 20 | | | | | | | | 9/0.5' 50/0.3' HAMMER BOUNCES |
| | END OF PENETRATION @ 20.8' 12-19-73 | | | | | | | | | |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING
~~BORING~~ NO. 16 Sheet No. _____ of _____

Driller: W. LUM ASSOC, INC. Date: DEC. 13, 1973

Field Party: MEYER, KAU, OMORI

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 69'± * Datum: -

Drill Bit: _____

| | | | | |
|---|---|---|---|---|
| Water Level | NOT MEASURED | | | |
| Time | - | | | |
| Date | 12-13-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Sheer P.S.F. | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.= 69'± * | 0 | | | | | | | | |
| | | 5 | | | | | | | | |
| | | 10 | | | | | | | | |
| | | 15 | | | | | | | | |
| | | 20 | | | | | | | | |
| | END OF PENETRATION @ 24.9' 12-13-73 | 25 | | | | | | | | |

1/1.0' 2/1.0' 1/1.0' 1/0.5' 1/1.0' 1/0.5' 1/1.0' 3/1.0' 1/0.5' 1/1.0' 1/0.5' 1/1.0' 1/1.5' 1/1.0' 1/0.5' 3/1.0' 3/0.5' 2/0.5' 3/1.0' 17/0.5' 50/0.4'

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** [redacted] 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" DIAM. BLUNT POINT

PROBING
~~BORING~~ NO. 17 Sheet No. ____ of ____
Driller: W. LUM ASSOC., INC. Date: DEC. 3, 1973
Field Party: MEYER, KAU, OMORI
Type of Boring: CONTINUOUS PENETRATION Diam.: 2"
Elev.: 60'± * Datum: –
Drill Bit: ____

| | | | | |
|---|---|---|---|---|
| Water Level | +1.0' | | | |
| Time | – | | | |
| Date | 12-3-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-3-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F.(FIELD) |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.: 60'± ▽ | 0 | +1.0 | ▽ | | | | | | 757 |
| | | 5 | | | | | | | | 473 |
| | | | | | | | | | | 237 |
| | | 10 | | | | | | | | 1230 |
| | | 15 | | | | | | | | 899 |
| | | 20 | | | | | | | | |
| | | 25 | | | | | | | | |

PENETRATION DATA
~~Standard~~ CONTINUOUS Penetration Test
N (Blows per foot) 0 10 20 30 40

WT OF RODS
1/0.5'
1/2.5'
2/0.5'
2/1.0'
3/1.0'
2/1.0'
5/0.5'
19/0.5'
65
13/0.5'
50/0.2'
HAMMER BOUNCES

END OF PENETRATION @ 26.7'
12-3-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARK LANE COUNTRY HOMES

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING NO. 18 Sheet No. _____ of _____

Driller: W. LUM ASSOC., INC. Date: DEC. 19, 1973

Field Party: SUZUKI, OMORI, KAU

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 71' ± * Datum: -

Drill Bit: _____

Water Level: NOT MEASURED

Time: -

Date: 12-19-73

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. |
|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 71' ± * | 0 | | | | | | | |

PENETRATION DATA

~~Standard~~ CONTINUOUS Penetration Test

N (Blows per foot) 0 10 20 30 40

1/4.5'
1/2.0'
1/1.0'
2/1.0'
1/0.5'
3/1.0'
2/1.0'
3/1.0'
1/0.5'
3/0.5'
22/0.5'

END OF PENETRATION @ 30.5'
12-19-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROBING ~~BORING~~ NO. 19 Sheet No. _____ of _____

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

Driller W. LUM ASSOC., INC. Date DEC. 11, 1973

Field Party MEYER, OMORI, KAU

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 67'± * Datum —

Drill Bit _____

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

| Water Level | | | | |
|---|---|---|---|---|
| Time | | | | |
| Date | 12-11-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 67'± * | 0 | | | | | | | | WT. OF HAMMER |
| | | 5 | | | | | | | | 2/1.0' 3/1.0' 2/1.0' 3/1.0' |
| | | 10 | | | | | | | | 1/0.5' 1/1.0' 1/0.5' |
| | | 15 | | | | | | | | 2/1.0' 3/1.0' |
| | | 20 | | | | | | | | 1/0.5' 2/0.5' |
| | | 25 | | | | | | | | 41 47 |

END OF PENETRATION @ 29'
12-11-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING
~~BORING~~ NO. 20 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: DEC. 12, 1973

Field Party: MEYER, OMORI, KAU

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

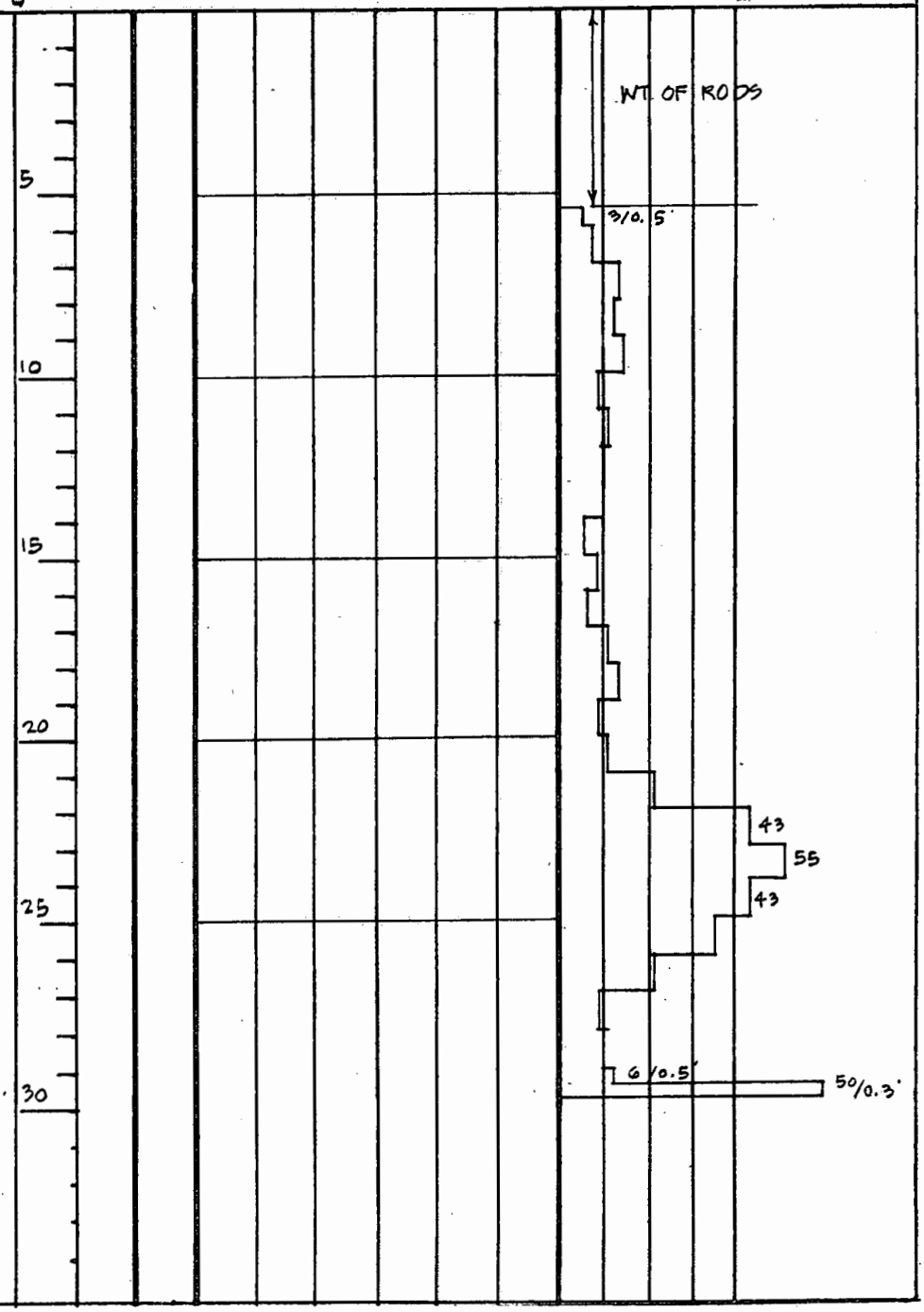
Elev.: 70'± * Datum: —

Drill Bit: ____

| Water Level | | | | |
|---|---|---|---|---|
| Time | — | | | |
| Date | 12-12-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. |
|---|---|---|---|---|---|---|---|---|---|
| | ELEV.: 70'± * | 0 | | | | | | | |

PENETRATION DATA
~~Standard~~ CONTINUOUS Penetration Test
N (Blows per foot) 0 10 20 30 40




END OF PENETRATION @ 29.8'
12-12-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

# WALTER LUM ASSOCIATES, INC.

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING NO. 21 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: DEC. 12, 1973

Field Party: METER, OMORI, KAU

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 69' ± * Datum: —

Drill Bit: ____

| | | | | | |
|---|---|---|---|---|---|
| Water Level | 0.2' | | | | |
| Time | — | | | | |
| Date | 12-12-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Sheer P.S.F. |
|---|---|---|---|---|---|---|---|---|---|
| | ELEV.: 69' ± * | 0 | | | | | | | |
| | WATER 12-12-73 | | | | | | | | |
| | | 5 | | | | | | | |
| | | 10 | | | | | | | |
| | | 15 | | | | | | | |
| | | 20 | | | | | | | |
| | END OF PENETRATION @ 23.9' 12-12-73 | | | | | | | | |

PENETRATION DATA
CONTINUOUS Penetration Test
N (Blows per foot) 0 10 20 30 40

2/1.0'
3/1.0'
3/1.0'
2/0.5'
8/0.5'
6/0.5'
16/0.5'
50
35/0.5'
50/0.4'

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.**

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING ~~BORING~~ NO. 22 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: DEC. 11, 1973

Field Party: MEYER, KAU, OMORI

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 68'± * Datum: —

Drill Bit: ____

| | | | | |
|---|---|---|---|---|
| Water Level | 0.0' | | | |
| Time | — | | | |
| Date | 12-11-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-11-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test — N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 68'± * | 0 | | | | | | | | | |
| | | 5 | | | | | | | | | 1/0.5' 1/1.0' 1/0.5' 1/1.5' 1/0.5' |
| | | 10 | | | | | | | | | 3/0.5' 1/0.5' 3/1.0' |
| | | 15 | | | | | | | | | 3/1.0' |
| | | 20 | | | | | | | | | |
| | END OF PENETRATION @ 24.5' 12-11-73 | 25 | | | | | | | | | 69 44/0.5' HAMMER BOUNCES |

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARK LANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING
~~BORING~~ NO. 23 Sheet No. _____ of _____

Driller: W. LUM ASSOC., INC. Date: DEC. 7, 1973

Field Party: METER, OMORI, KAU

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 62'± * Datum: –

Drill Bit: –

| | | | | |
|---|---|---|---|---|
| Water Level | +0.2' | | | |
| Time | – | | | |
| Date | 12-7-73 | | | |

PENETRATION DATA
~~Standard~~ CONTINUOUS Penetration Test
N (Blows per foot) 0 10 20 30 40

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-7-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV.: 62'± * | 0 | +0.2' | ▽ | | | | | | |

WT OF RODS

2/1.0'
3/1.0'
2/1.0'
3/1.0'
2/1.0'
3/1.0'
45
5/0.5'
50/0.5'

END OF PENETRATION @ 27'
12-7-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PARKLANE COUNTRY HOMES
LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"
SAMPLER: 2" DIAM. BLUNT POINT

PROBING ~~BORING~~ NO. 24 Sheet No. ____ of ____
Driller W. LUM ASSOC. INC. Date DEC. 7, 1973
Field Party MEYER, KAU, OMORI
Type of Boring CONTINUOUS PENETRATION Diam. 2"
Elev. 60'± * Datum —
Drill Bit ____

| | | | | |
|---|---|---|---|---|
| Water Level | NOT MEASURED | | | |
| Time | — | | | |
| Date | 12-7-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test — N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 60'± * | 0 | | | | | | | | |
| | | 5 | | | | | | | | WT. OF HAMMER; 1/0.5'; 2/1.0'; 3/1.0'; 2/0.5'; 1/1.0' |
| | | 10 | | | | | | | | WT. OF HAMMER; 1/1.0'; 1/0.5'; 1/1.0'; 2/1.0'; 1/0.5'; 1/1.0'; 1/0.5'; 1/1.0'; 2/1.0' |
| | | 15 | | | | | | | | |
| | | 20 | | | | | | | | |
| | | 25 | | | | | | | | 12/0.5'; 51; 73; 4%.2 |
| | | 30 | | | | | | | | |

END OF PENETRATION @ 31.7'
12-7-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

~~BORING~~ PRODING NO. 25 Sheet No. ____ of ____

Driller: W. LUM ASSOC., INC. Date: Nov. 30, 1973

Field Party: MEYER, OMORI, KAU

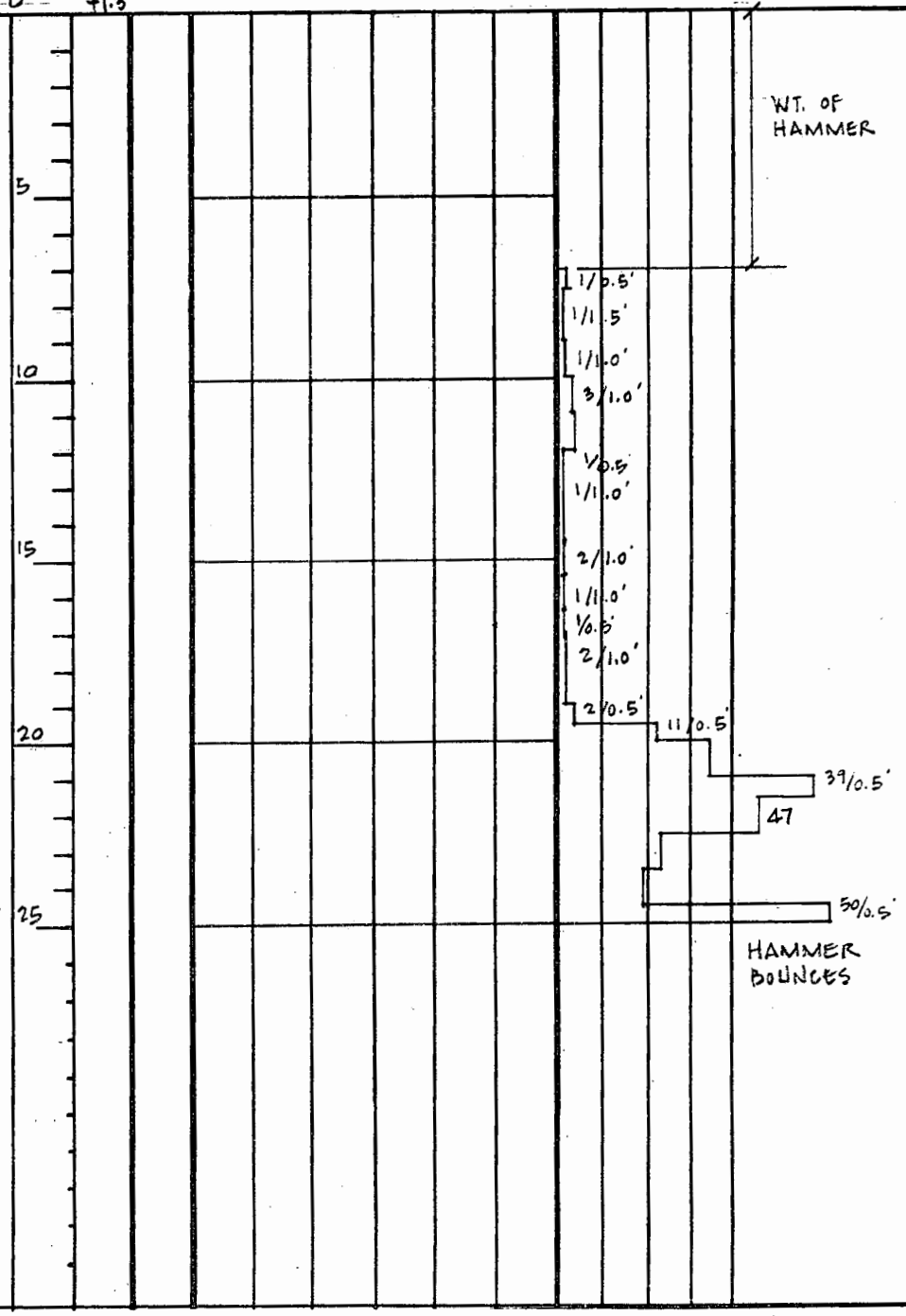
Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 59'± * Datum: —

Drill Bit: ____

| | | | | |
|---|---|---|---|---|
| Water Level | +1.3' | | | |
| Time | — | | | |
| Date | 11-30-73 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 11-30-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 59'± * | 0 | +1.3' | ▽ | | | | | | | |




END OF PENETRATION @ 25'
11-30-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PARKLANE COUNTRY HOMES

LOCATION: Waihee, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" DIAM. BLUNT POINT

PROBING NO. 26 Sheet No. _____ of _____

Driller: W. LUM ASSOC., INC. Date: DEC. 12, 1973

Field Party: MEYER, OMORI, KAU

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: 70'± * Datum: -

Drill Bit: _____

| | | | | | |
|---|---|---|---|---|---|
| Water Level | 0.2' | | | | |
| Time | - | | | | |
| Date | 12-12-73 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | WATER 12-12-73 | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: CONTINUOUS Penetration Test, N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ELEV. = 70'± * | 0 | +0.2' | ▽ | | | | | | | WT OF RODS |
| | | 5 | | | | | | | | | |
| | | 10 | | | | | | | | | 11/0.5' 4/0.5' 1/0.5' 3/0.5' 9/0.5' 17/0.5' |
| | | 15 | | | | | | | | | |

END OF PENETRATION @ 19'
12-12-73

*Elevation estimated from grading plan by Gray, Rhee & Assoc. dated 11-29-73.

PARKLANE

**WALTER LUM ASSOCIATES, INC.** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROBING NO. 27 Sheet No. _____ of _____

PROJECT PARKLANE COUNTRY HOMES

LOCATION Waihee, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

Driller W. LUM ASSOC., INC. Date DEC. 11, 1973

Field Party MEYER, OMORI, KAU

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. 68'± * Datum —

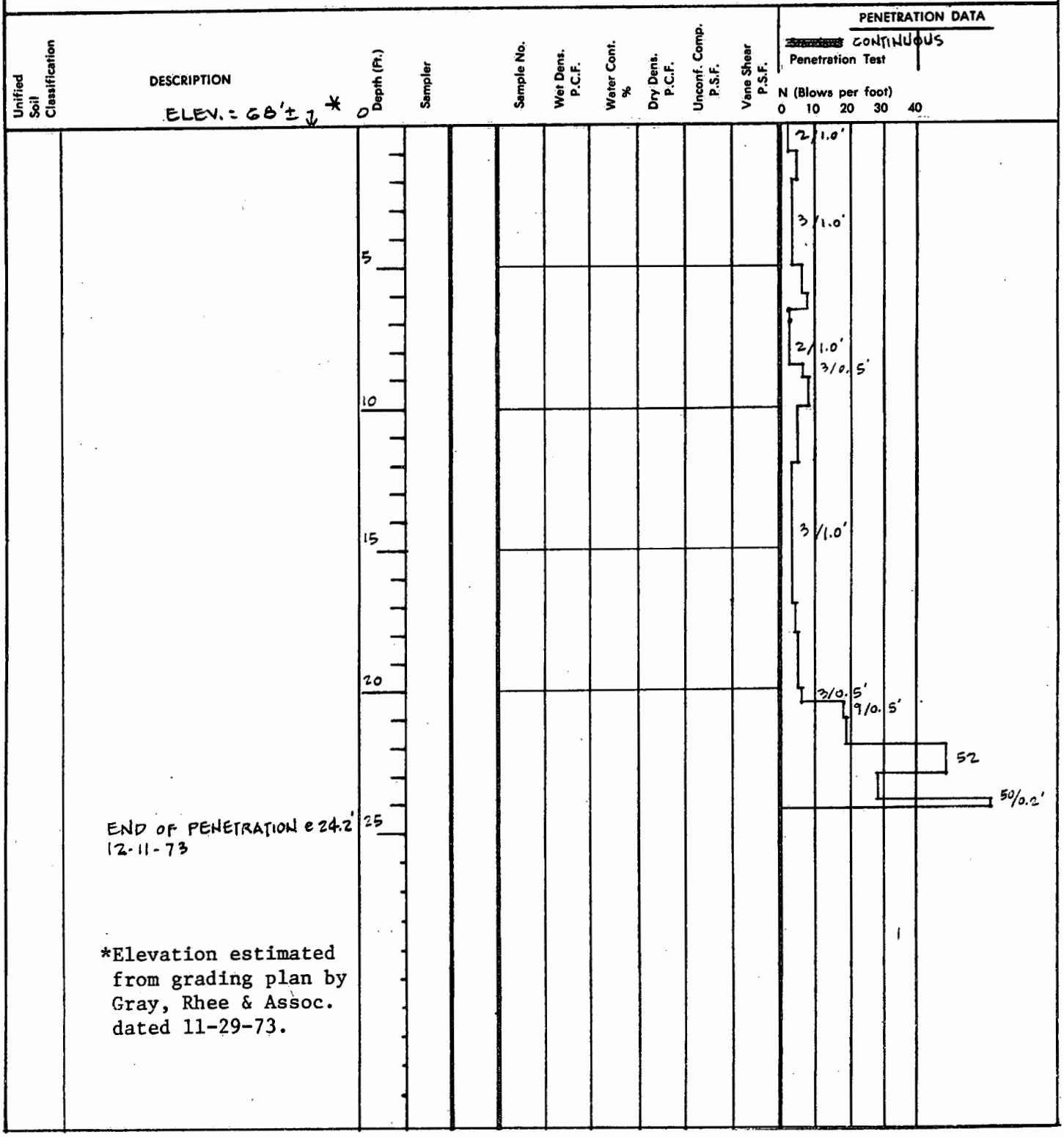
Drill Bit _____

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" DIAM. BLUNT POINT

| Water Level | NOT MEASURED | | | |
|---|---|---|---|---|
| Time | — | | | |
| Date | 12-11-73 | | | |

PENETRATION DATA
CONTINUOUS Penetration Test



PARKLANE COUNTRY HOMES

TABLE I A - SUMMARY OF LABORATORY TEST RESULTS

| | | | | |
|---|---|---|---|---|
| BORING NO. | 3 | 4 | 5 | |
| SAMPLE NO. | B (TOP) | | A | |
| DEPTH BELOW SURFACE | 5'-7' | SURFACE | 1'-2' | |
| DESCRIPTION | GRAY ORGANIC CLAYS & SILTS | BROWN CLAYEY SILT | GRAY ORGANIC CLAYS & SILTS | |
| GRAIN-SIZE ANALYSIS (% Passing) Sieve | | | | |
| 1" | | | | |
| 1/2" | | | | |
| #4 | | | | |
| #10 | | | | |
| #20 | | | | |
| #40 | | | | |
| #100 | | | | |
| #200 | | | | |
| ATTERBERG LIMITS | | | | |
| Air Dried or Natural | NATURAL | NATURAL | NATURAL | |
| Liquid Limit | 91 | 102 | 89 | |
| Plastic Limit | 45 | 54 | 46 | |
| Plasticity Index | 46 | 48 | 43 | |
| Dilatancy | MED.-QUICK | MED.-QUICK | MEDIUM | |
| Toughness | MEDIUM | MEDIUM | MEDIUM | |
| Dry Strength | SLIGHT-MED. | SLIGHT-MED | MEDIUM | |
| UNIFIED SOIL CLASSIFICATION | OH | MH | OH | |
| APPARENT SPECIFIC GRAVITY | | | | |
| CBR TEST (Surcharge-51 P.S.F.) | | | | |
| Molding Moisture, % | | 47.0 | | |
| Molding Dry Density, P.C.F. | | 73.2 | | |
| Swell upon saturation, % | | 0.9 | | |
| CBR at 0.1" Penetration | | 10.7 | | |
| MOISTURE-DENSITY RELATIONS OF SOILS (AASHO T-180-73I, Method ___) | | | | |
| Dry to Wet or Wet to Dry | | | | |
| Max. Dry Density (P.C.F.) | | | | |
| Optimum Moisture (%) | | | | |

REMARKS:

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-3-74 By BT

3-1273

PARKLANE COUNTRY HOMES

TABLE I B - SUMMARY OF LABORATORY TEST RESULTS

| | | | | |
|---|---|---|---|---|
| BORING NO. | 6 | 6 | 6 | 6 |
| SAMPLE NO. | B | C (TOP) | C (BTM.) | E |
| DEPTH BELOW SURFACE | 4.5'-6' | 10'-11.5' | 10'-11.5' | 20'-21.5' |
| DESCRIPTION | GRAY ORGANIC CLAYS & SILTS W/ POCKETS OF PEAT | GRAY ORGANIC SANDY SILT | GRAY-BROWN SILTY SAND (ORGANIC ?) | GRAY ORGANIC CLAYS & SILTS |
| GRAIN-SIZE ANALYSIS (% Passing) Sieve | | | | |
| 1" | | | 100 | |
| 1/2" | | | 100 | |
| #4 | | | 99.9 | |
| #10 | | | 99.6 | |
| #20 | | | 95.3 | |
| #40 | | | 77.8 | |
| #100 | | | 42.6 | |
| #200 | | | 35.8 | |
| ATTERBERG LIMITS | | | | |
| Air Dried or Natural | NATURAL | NATURAL | | NATURAL |
| Liquid Limit | 139 | 72 | | 79 |
| Plastic Limit | 56 | 42 | | 40 |
| Plasticity Index | 83 | 30 | | 39 |
| Dilatancy | MEDIUM | MED.-QUICK | | MED.-QUICK |
| Toughness | SLIGHT-MED. | SLIGHT-MED | | MEDIUM |
| Dry Strength | SLIGHT | SLIGHT | | SLIGHT-MED. |
| UNIFIED SOIL CLASSIFICATION | OH-PT | OH | SM | OH |
| APPARENT SPECIFIC GRAVITY | | | | 2.67 |
| CBR TEST (Surcharge-51 P.S.F.) | | | | |
| Molding Moisture, % | | | | |
| Molding Dry Density, P.C.F. | | | | |
| Swell upon saturation, % | | | | |
| CBR at 0.1" Penetration | | | | |
| MOISTURE-DENSITY RELATIONS OF SOILS | | | | |
| (AASHO T-180-73I, Method ___) | | | | |
| Dry to Wet or Wet to Dry | | | | |
| Max. Dry Density (P.C.F.) | | | | |
| Optimum Moisture (%) | | | | |

REMARKS:

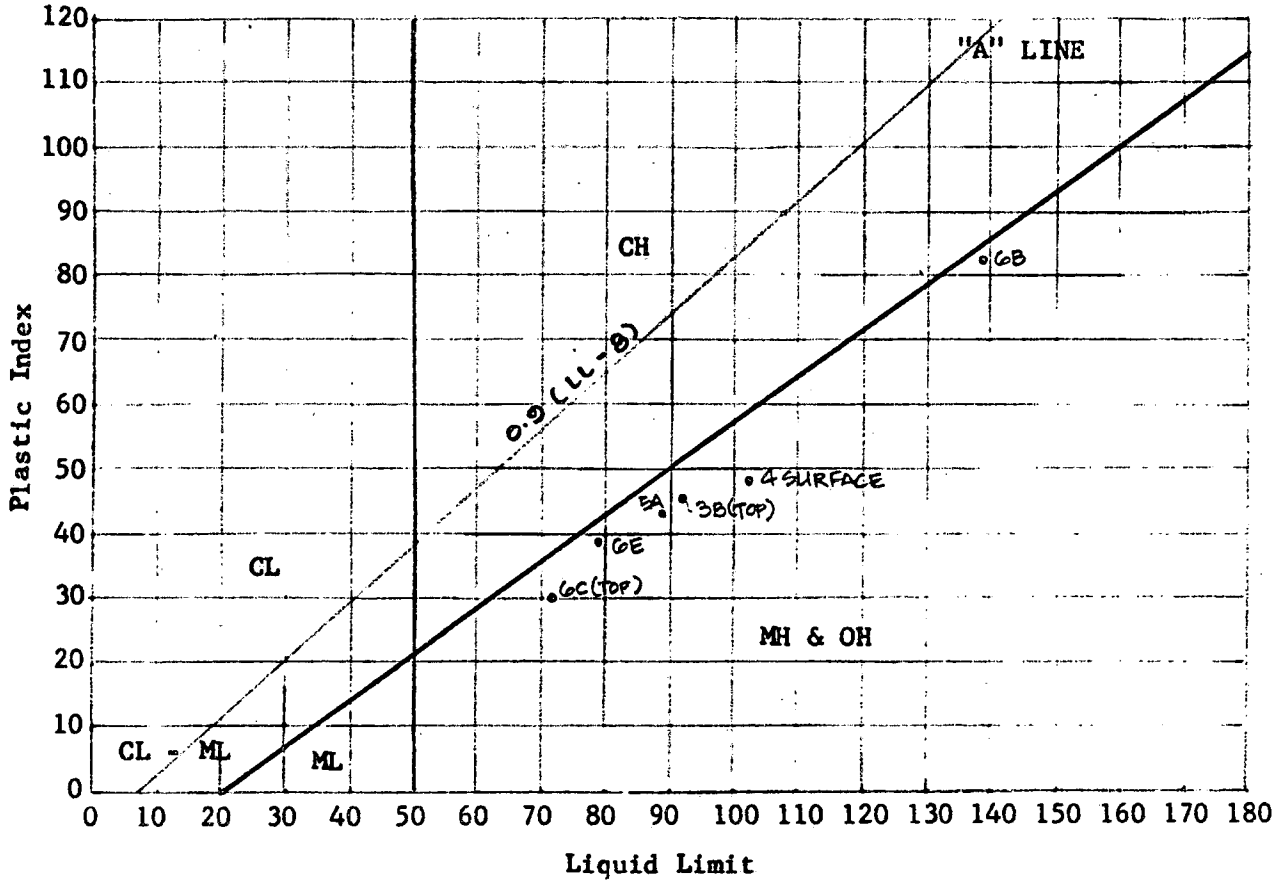
WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

Date 1-3-74 By BT

3-1273

JOB: PARKLANE COUNTRY HOMES

LOCATION: WAIHEE, KOOLAUPOKO, OAHU, HAWAII

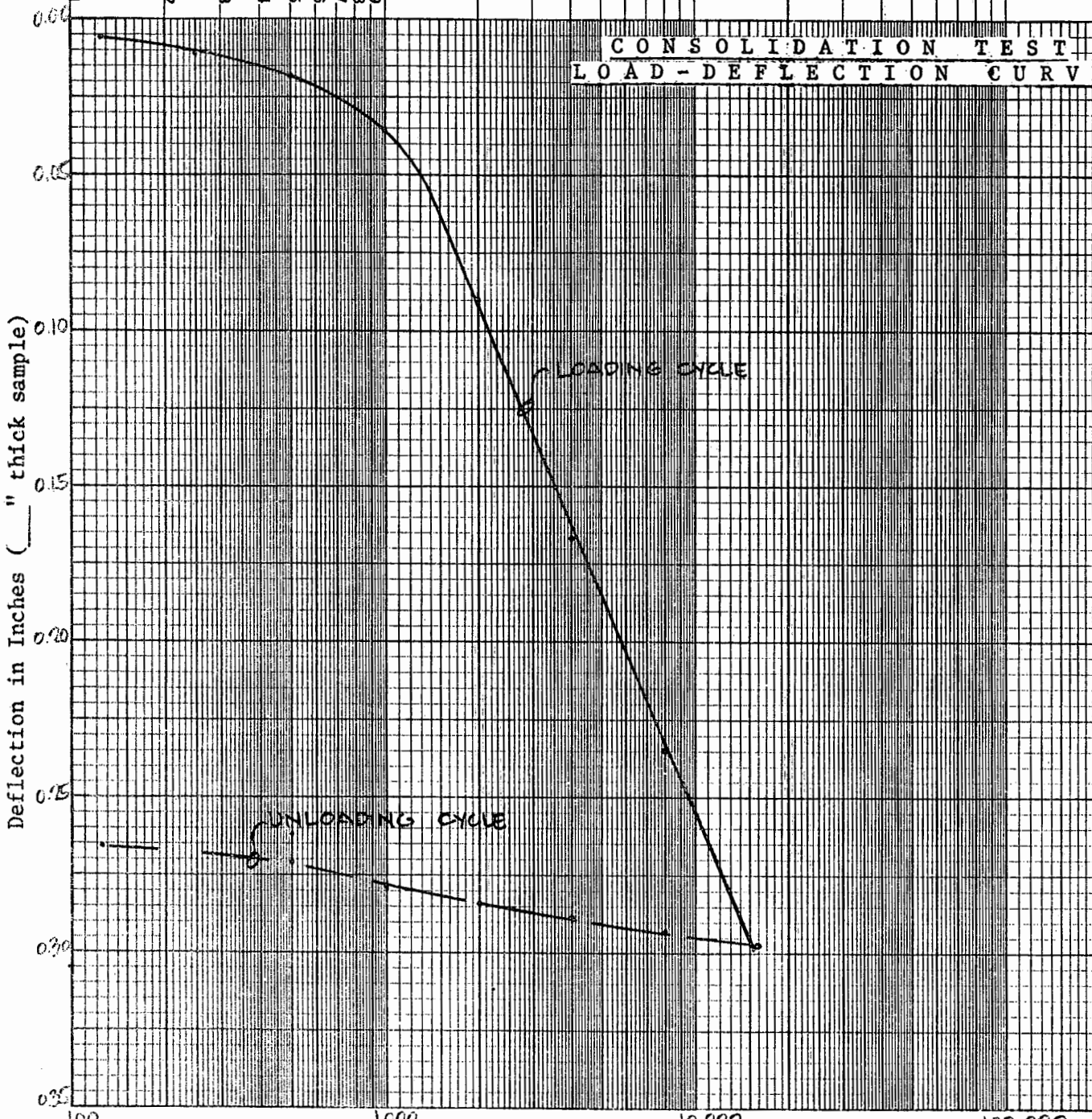



PLASTICITY CHART

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

1-3-74 BT

# CONSOLIDATION TEST
## LOAD-DEFLECTION CURVE




PROJECT: PARKLANE COUNTRY HOMES

LOCATION: WAIHEE, KOOLAUPOKO, OAHU, HAWAII

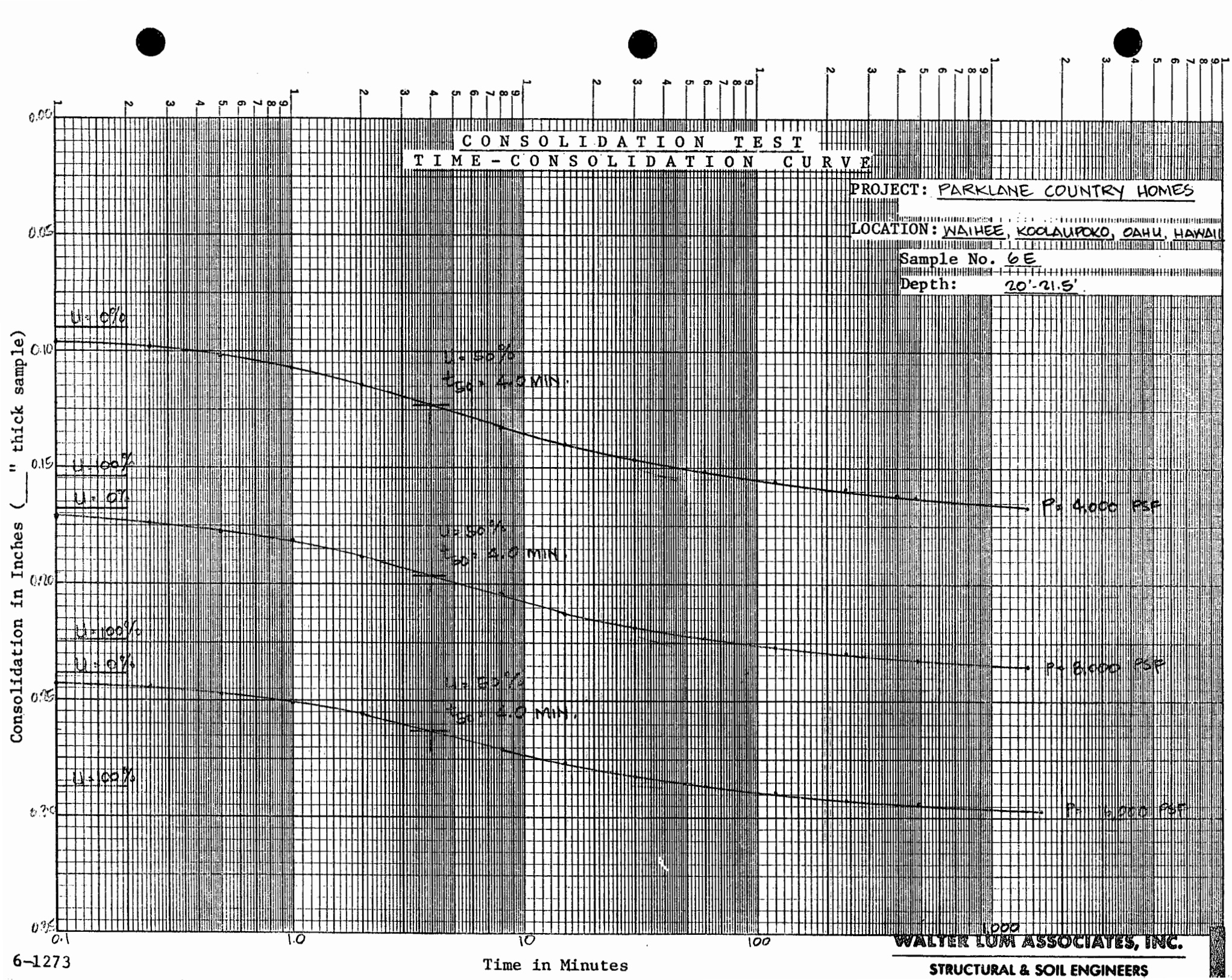
| | |
|---|---|
| Sample No. | 6-E |
| Depth: | 20'-21.5' |
| Water Content (Before Test) | 78.9 % |
| Water Content (After Test) | 56.2 % |
| Sample Dry Weight | 65.1 g |
| Height of Sample: | 1.00 " |
| Diameter of Sample: | 2.375" |
| Area of Sample: | 4.430" |
| Specific Gravity: | 2.87 |

ATTERBERG LIMITS:

| | |
|---|---|
| Liquid Limit | 79 |
| Plastic Limit | 40 |
| Plasticity Index | 39 |

5-1273

WALTER LUM ASSOCIATES, INC.
STRUCTURAL & SOIL ENGINEERS




6-1273

WALTER LUM ASSOCIATES, INC.

STRUCTURAL & SOIL ENGINEERS

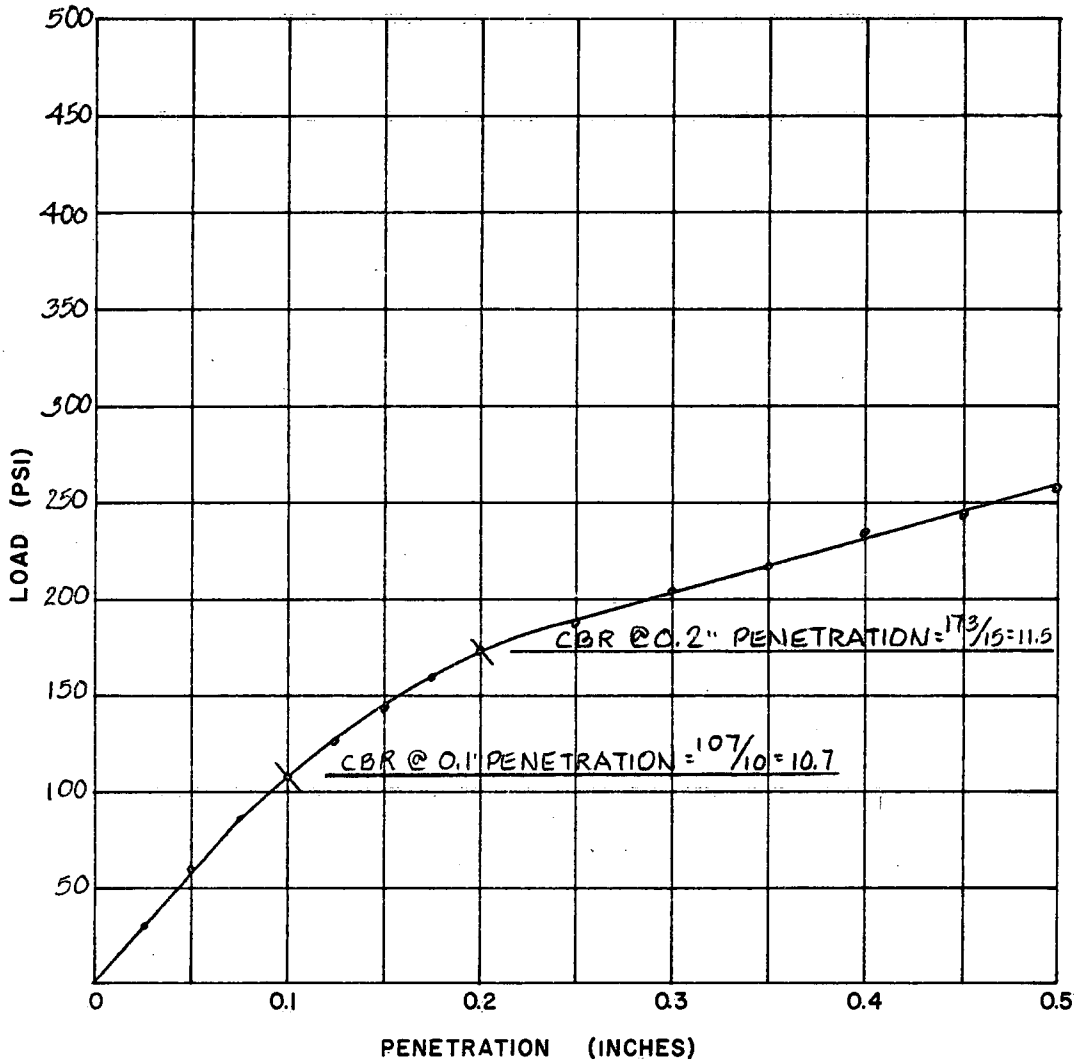
# CBR TEST

**PROJECT:** PARKLANE COUNTRY HOMES

**LOCATION:** WAIHEE, KOOLAUPOKO, OAHU, HAWAII

**SAMPLE NO:** 4 SURFACE

**SAMPLE DESCRIPTION:** BROWN CLAYEY SILT




**CBR PENETRATION DATA**

| PENETRATION (INCHES) | LOAD (LBS.) | LOAD (PSI) |
|---|---|---|
| 0.025 | 90 | 30 |
| 0.050 | 180 | 60 |
| 0.075 | 250 | 83 |
| 0.100 | 320 | 107 |
| 0.125 | 380 | 127 |
| 0.150 | 430 | 143 |
| 0.175 | 480 | 160 |
| 0.200 | 520 | 173 |
| 0.250 | 560 | 187 |
| 0.300 | 610 | 203 |
| 0.350 | 650 | 217 |
| 0.400 | 700 | 233 |
| 0.450 | 730 | 243 |
| 0.500 | 770 | 257 |

AGGREGATE 1/4" MINUS

HAMMER WEIGHT 10 LBS

HAMMER DROP 18 INS

No. OF BLOWS 56/LAYER

No. OF LAYERS 5

## TEST RESULTS:

MOLDING MOISTURE, %. 47.0

MOLDING DRY DENSITY, P.C.F. 73.2

CBR @ 0.1" PENETRATION 10.7

DAYS SOAKED 5

DATE 1-2-74 BY EM

DATE 1-3-74 BY J.S.

WALTER LUM ASSOCIATES, INC.
CIVIL, STRUCTURAL, SOILS ENGINEERS

LOGS OF BORINGS

FROM

"PROPOSED SUBDIVISION (10± ACRES)"

DATED DECEMBER 4, 1970

AND

UPDATED REPORT, "PROPOSED PD-HOUSING PARKLANE COUNTRY HOMES"

DATED MARCH 1, 1973

**WALTER LUM ASSOCIATES** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PROPOSED SUBDIVISION (10+ Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight 140#
Drop 30"

SAMPLER: 2" ⌀ - 2" O.D. THIN WALL TUBE
2" ⌀ - 2" STANDARD SPLIT SPOON

BORING NO. 1 Sheet No. ____ of ____
Driller WALTER LUM ASSOC. Date OCT. 9, 14 & 15, 1970
Field Party GLORY, ASATO
Type of Boring AUGER (MOBILE B-40L) Diam. 4"
Elev. ____ Datum ____
Drill Bit T.C. DRAG

| | | | | | |
|---|---|---|---|---|---|
| Water Level | 14.5' | 13.5' | | | |
| Time | 3:30 PM | 10:00 AM | | | |
| Date | 10-9-70 | 10-14-70 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: Standard Penetration Test N (Blows per foot) | PENETRATION DATA: 2" O.D. THIN WALL TUBE BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (MH) | STIFF, MOTTLED BROWN, CLAYEY SILT W/ROOTS & GRAVEL COBBLE OR BOULDER | 0 | 2"SS | 1-A | - | 40 | - | - | - | 4/.5' 10/.5' | |
| | | 5 | 2"S | 1-B | 103 | 52 | 68 | - | - | | 4/.5' 5/.5' |
| | TAN, DECOMPOSED ROCK (CRUSHES TO SILTY SAND) | 10 | 2"S | 1-C | - | 59 | - | - | - | | 6/.5' 0/.5' |
| | TAN BROWN, DECOMPOSED ROCK | 15 | 2"SS | 1-D | - | 54 56 | - | - | - | | |
| MH | MEDIUM, MOTTLED DARK BROWN, CLAYEY SILT W/DEC. ROCK & GRAVEL | | | | | LL = 63 PL = 46 | | | | | |
| SM | MOTTLED BROWN & GRAY DECOMPOSED ROCK W/SAND, GRAVEL & TRACE OF GRAY CLAY | 20 | 2"SS | 1-E | - | 49 | - | - | - | | |
| | MOTTLED BROWN, GRAVEL & DECOMPOSED ROCK W/ CLAYEY SILT | 25 | 2"SS | 1-F | - | 60 | - | - | - | | |
| | | 30 | 2"SS | 1-G | - | 60 70 | - | - | - | | |
| | LOOSE, MOTTLED BROWN DECOMPOSED ROCK & GRAVEL W/ BROWN CLAYEY SILT | 35 | 2"SS | 1-H | - | 55 | - | - | - | | |
| | | 40 | 2"SS | 1-I | - | 60 | - | - | - | | |
| | STIFF, MOTTLED BROWN CLAYEY SILT W/ DECOMPOSED ROCK | 45 | | | | | | | | | |
| | | 50 | | | | | | | | | |
| | NOTE: 10-9-70 DRILLED TO 21.5' 10-14-70 MOVED 6' AND DRILLED TO 41.5' 10-15-70 CONTINUED FROM 41.5' TO 61.5' | 55 | | | | | | | | | |
| | END OF BORING @ 61.5' | 60 | 2"SS | 1-J | - | 59 | - | - | - | | |

**WALTER LUM ASSOCIATES** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PROPOSED SUBDIVISION (10± Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:

Weight:

Drop:

SAMPLER:

BORING NO. 1A Sheet No. ____ of ____

Driller WALTER LUM ASSOC. Date OCT. '70

Field Party SHUMAKER

Type of Boring HAND AUGER Diam. 4"

Elev. ____ Datum ____

Drill Bit ____

| | | | | | |
|---|---|---|---|---|---|
| Water Level | 0.1' | | | | |
| Time | - | | | | |
| Date | 10-9-70 | | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| OH | SOFT, DARK GRAY-BLACK ORGANIC CLAY (PEATY) | 0 | | 1A-A | - | 103<br>LL = 111<br>PL = 46 | - | - | - | |
| OH | SOFT, DARK GRAY ORGANIC CLAY (MUCK) W/ SAND & GRAVEL | 5 | | 1A-B | - | 86<br>LL = 86<br>PL = 44 | - | - | - | |
| | END OF BORING @ 6' | | | | | | | | | |

# WALTER LUM ASSOCIATES

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PROPOSED SUBDIVISION (10± Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140
Drop: 30"

SAMPLER: 2"ϕ - 2" O.D. THIN WALL TUBE
2"ϕϕ - 2" STANDARD SPLIT SPOON

BORING NO. 3 Sheet No. _____ of _____

Driller: WALTER LUM ASSOC. Date: OCT. 20, 1970

Field Party: GLORY , ASATO

Type of Boring: HAND AUGER Diam.: 4"

Elev. _____ Datum _____

Drill Bit _____

| | | | | |
|---|---|---|---|---|
| Water Level | 0.2' | | | |
| Time | 10:00 AM | | | |
| Date | 10-20-70 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 2" O.D. THIN WALL TUBE BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SOFT, BROWN ORGANIC MATTER (ROOTS) | 0 | WATER | | | | | | | | |
| | | | 2"ϕ | 3-A | 96 | 85 | 52 | 880 | 400 | | PUSH/1.5' |
| OH | SOFT, GRAY BROWN, ORGANIC SILTS & CLAYS (SLIGHTLY PEATY) | 5 | | | | LL= 104 PL= 47 | | | | | |
| | | | 2"ϕ | 3-B | 93 | 154 | 37 | 260 | 160 | | PUSH/2.0' |
| | DECOMPOSED WOOD W/ ORGANIC SILTY CLAY | 10 | | | | | | | | | |
| (OH) | SOFT, GRAY BROWN, ORGANIC SILTS & CLAYS W/ SAND | | 2"ϕ | 3-C | 97 | 76 | 55 | 730 | 250 | | PUSH/2.0' |
| | | 15 | | | | | | | | | |
| OH | SOFT, GRAY ORGANIC SANDY CLAY | | 2"ϕ | 3-D | 102 | 81 | 56 | 830 | 360 | | 1/.5' 2/.5' 2/.5' |
| | | | | | | LL= 90 PL= 45 | | | | | |
| | | 20 | | | | | | | | | |
| OH | STIFF, BROWN & GRAY ORGANIC CLAY W/ SAND | | 2"ϕ | 3-E | 114 | 70 | 67 | 420 | 100 | | 4/.5' 4/.5' 8/.4' 8/.1' |
| | | | 2"ϕϕ | 3-F | - | FRAGMENT | - | - | - | | 24/.3' |
| | DECOMPOSED ROCK | | | | | | | | | | |
| | END OF BORING @ 22.8' | | | | | | | | | | |

# WALTER LUM ASSOCIATES

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PROPOSED SUBDIVISION (10± Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" STANDARD SPLIT SPOON

BORING NO. 4 Sheet No. ____ of ____

Driller: WALTER LUM ASSOC. Date: OCT 23, 1970

Field Party: SUZUKI, GLORY

Type of Boring: AUGER (MOBILE B-30) Diam.: 4"

Elev. ____ Datum ____

Drill Bit: T.C. DRAG

| | | | | | |
|---|---|---|---|---|---|
| Water Level | 28.0' | 24.5' | | | |
| Time | 2:20 PM | 9:30 AM | | | |
| Date | 10-23-70 | 10-26-70 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: Standard Penetration Test, N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | BROWN, SILTY CLAY W/ TRACES OF SAND | 0 | | | | | | | | |
| | MOTTLED BROWN, SILTY CLAY W/TRACES OF DECOMPOSED ROCK & GRAVEL | 5 | | | | | | | | |
| | TAN, CLAYEY SILT W/ TRACES OF DECOMPOSED ROCK | 10 | | | | | | | | |
| MH | STIFF, MOTTLED BROWN, CLAYEY SILT W/ TRACES OF FINE SAND & DECOMPOSED ROCK | 15 | | 4-A | - | 60 | - | - | - | |
| | | 20 | | | | | | | | |
| | | 25 | WATER 10-26-70 | | | | | | | |
| (GM) | STIFF, MOTTLED BROWN, CLAYEY SILT & DECOMPOSED ROCK W/GRAVEL | 30 | | 4-B | - | 59 | - | - | - | |
| | END OF BORING @ 31.5' | | | | | | | | | |

# WALTER LUM ASSOCIATES

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PROPOSED SUBDIVISION (10+ Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:

Weight: 10# SLEDGE HAMMER

Drop:

SAMPLER: 2" O.D THIN WALL TUBE

BORING NO. 5 Sheet No. ____ of ____

Driller: WALTER LUM ASSOC. Date: OCT. 20 & 21, 1970

Field Party: GLORY, ASATO

Type of Boring: HAND AUGER Diam.: 4"

Elev.: Datum:

Drill Bit:

| | | | | | |
|---|---|---|---|---|---|
| Water Level | 0.3' | 0.3' | | | |
| Time | 3:45 PM | 2:00 PM | | | |
| Date | 10-20-70 | 10-21-70 | | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 10# SLEDGE HAMMER BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SOFT, BROWN, ORGANIC MATTER W/TRACES OF ORGANIC CLAY & GRAVEL | 0 | | | | | | | | | |
| (OH) | SOFT, GRAY & BROWN, ORGANIC CLAY W/ORGANIC MATTER | 5 | | 5-A | 90 | 102 | 45 | 620 | 460 | | PUSH/.5' 1/.5' 1/.5' |
| OH | SOFT, BROWN & GRAY, ORGANIC CLAY W/SAND (SLIGHTLY PEATY) | | | 5-B | 103 | 89<br>LL = 84<br>PL = 45 | 55 | 360 | 200 | | PUSH/1.0' 1/.5' |
| (GM) | DENSE, SAND & GRAVEL W/ GRAY SILTY CLAY | 10 | | 5-C | 86 | 28<br>53 | 43 | 360 | 100 | | 14/.5' 24/.5' |
| | END OF BORING @ 15' | 15 | | | | | | | | | |

# WALTER LUM ASSOCIATES

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

SOUNDING ~~BORING~~ NO. 6 Sheet No. _____ of _____

PROJECT PROPOSED SUBDIVISION (10+ Acres)

Driller WALTER LUM ASSOC. Date NOV. 24, 1970

LOCATION Waihee, Koolaupoko, Oahu, Hawaii

Field Party GLORY, KAKU

Tax Map Key: 4-7-06: 20

Type of Boring CONTINUOUS PENETRATION Diam. 2"

Elev. _____ Datum _____

HAMMER:

Drill Bit _____

Weight 140#

Drop 30"

Water Level +0.5'

Time 11:30 AM

Date 11-24-70

SAMPLER: 2" DIA. BLUNT POINT

| Unified Soil Classification | DESCRIPTION | WATER (11-24-70) | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA ~~Standard~~ CONTINUOUS Penetration Test N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | | | | | | | | HAND PUSH/1.5' |
| | | | | | | | | | | | ONE BLOW/2.0' |
| | | | 5 | | | | | | | | 3 BLOWS/1.5' |
| | | | | | | | | | | | 3 BLOWS/1.0' |
| | | | 10 | | | | | | | | ONE BLOW/1.0' |
| | | | | | | | | | | | 3 BLOWS/1.0' |
| | | | | | | | | | | | 4 BLOWS/1.0' |
| | | | 15 | | | | | | | | |
| | | | | | | | | | | | |
| | | | 20 | | | | | | | | |
| | | | | | | | | | | | |
| | END OF PENETRATION @ 25.2' | | 25 | | | | | | | | 16/.5' 19/.3' 40/.4' HAMMER BOUNCES |

# WALTER LUM ASSOCIATES

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7932

## Boring Log

PROJECT: PROPOSED SUBDIVISION (10± Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2" O.D. THIN WALL TUBE

BORING NO. 7 Sheet No. ____ of ____

Driller: WALTER LUM ASSOC. Date: NOV. 27, 1970

Field Party: GLORY, KAKU

Type of Boring: HAND AUGER Diam.: 3"

Elev.: ____ Datum: ____

Drill Bit: —

| | | | | |
|---|---|---|---|---|
| Water Level | +0.5' | | | |
| Time | — | | | |
| Date | 11-27-70 | | | |

| Unified Soil Classification | DESCRIPTION | WATER (11-27-70) | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: Standard Penetration Test / 2" O.D. THIN WALL TUBE SAMPLER — N (Blows per foot) 0 10 20 30 40 BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | VERY SOFT, BROWN, ORGANIC CLAYEY SILT & ROOTS | | 0 | | | | | | | | |
| (OH PT) | VERY SOFT, GRAY & BROWN ORGANIC MUCK | | | | | | | | | | |
| | | | | | 7-A | | 282 | | | | PUSH/2.0' |
| (PT) | PEAT | | 5 | | | | 428 | | | | |
| | | | | | 7-B | | 81 | | | | 2/.5' 2/.5' |
| (GM) | LOOSE, BROWN SILTY GRAVEL W/SAND & TRACES OF BRN. CLAY | | | | | | | | | | |
| | END OF BORING @ 6' | | | | | | | | | | |

# WALTER LUM ASSOCIATES

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PROPOSED SUBDIVISION (10+ Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii
Tax Map Key: 4-7-06: 20

HAMMER:
Weight: 140#
Drop: 30"

SAMPLER: 2"ϕ - 2" O.D. THIN WALL TUBE
2"ϕ. 2" STANDARD SPLIT SPOON

BORING NO. 9 Sheet No. ____ of ____
Driller WALTER LUM ASSOC. Date NOV. 25, 1970
Field Party GLORY, KAKU
Type of Boring AUGER (MOBILE MINUTEMAN) Diam. 3"
Elev. ____ Datum ____
Drill Bit T.C. DRAG

| | | | |
|---|---|---|---|
| Water Level | 5.0' | | |
| Time | 11:30 AM | | |
| Date | 11-25-70 | | |

| Unified Soil Classification | DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: Standard Penetration Test N (Blows per foot) 0 10 20 30 40 | PENETRATION DATA: 2" O.D. THIN WALL TUBE BLOWS/0.5' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | SOFT, BROWN, SILTY CLAY W/ORGANIC MAT. | 0 | 2"ϕ | 9-A | 101 | 68 | 60 | 2390 | 750<br>760 | | HAND PUSH/.5'<br>1/.5' 1/.5' |
| (CH) | SOFT, MOTTLED BROWN & GRAY CLAY W/ ROOTS (SLIGHTLY ORGANIC) | | | | | | | | | | |
| | | 5 | WATER (11-25-70) | | | | | | | | |
| (CH) | SOFT, BROWN, CLAY W/ TRACES OF SAND & GRAVEL (SLIGHTLY ORGANIC) | | 2"ϕ | 9-B | 101 | 71<br>65 | | 1140<br>990 | {200 {240<br>{260 {400 | | 140# WT/.5'<br>1/1.5' |
| (GC) | WEATHERED ROCK & GRAVEL W/SAND & TRACES OF BROWN CLAY | 10 | | | | | | | | | |
| (SM) | MEDIUM DENSITY, SILTY SAND W/SOME GRAVEL | | 2"ϕϕ | 9-C | | 24<br>46 | | | | | |
| | WEATHERED & DECOMPOSED ROCK W/ TRACES OF BROWN CLAY | 15 | 2"ϕϕ | 9-D | | 27 | | | | | |
| | | 20 | | | | | | | | | |
| | END OF BORING @ 21.3' | | 2"ϕϕ | 9-E | | ROCK FRAGMENT | | | | | 33/.3'<br>HAMMER BOUNCES |

**WALTER LUM ASSOCIATES** 3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

# Boring Log

PROJECT: PROPOSED SUBDIVISION (10± Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:

Weight: 10# SLEDGE HAMMER

Drop:

SAMPLER: "A" SIZE RODS (1⅝" O.D)

SOUNDING ~~BORING~~ NO. 10 Sheet No. ____ of ____

Driller: WALTER LUM ASSOC. Date: NOV. 23, 1970

Field Party: GLORY, KAKU

Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: ____ Datum: ____

Drill Bit: ____

| | | | | | |
|---|---|---|---|---|---|
| Water Level | 0.5'± | | | | |
| Time | 2:00 PM | | | | |
| Date | 11-23-70 | | | | |

| Unified Soil Classification | DRILLERS DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test; N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | WATER | 0 | | | | | | | | |
| | SOFT, BROWN, ORGANIC CLAYEY SILT & ROOTS | 5 | | | | | | | | HAND PUSH/2.5' 3/1.5' 10# SLEDGE HAMMER |
| | | 10 | | | | | | | | |
| | END OF PENETRATION @ 17.5' | 15 | | | | | | | | 12/1.5' |

# WALTER LUM ASSOCIATES

3030 WAIALAE AVENUE • HONOLULU, HAWAII 96816 • PHONE 737-7931

## Boring Log

PROJECT: PROPOSED SUBDIVISION (10+ Acres)

LOCATION: Waihee, Koolaupoko, Oahu, Hawaii

Tax Map Key: 4-7-06: 20

HAMMER:

Weight: 10# SLEDGE HAMMER

Drop:

SAMPLER: "A" SIZE RODS (1 5/8" O.D. RODS)

SOUNDING ~~BORING~~ NO. 11 Sheet No. ____ of ____

Driller: WALTER LUM ASSOC. Date: NOV. 23, 1970

Field Party: GLORY, KAKU

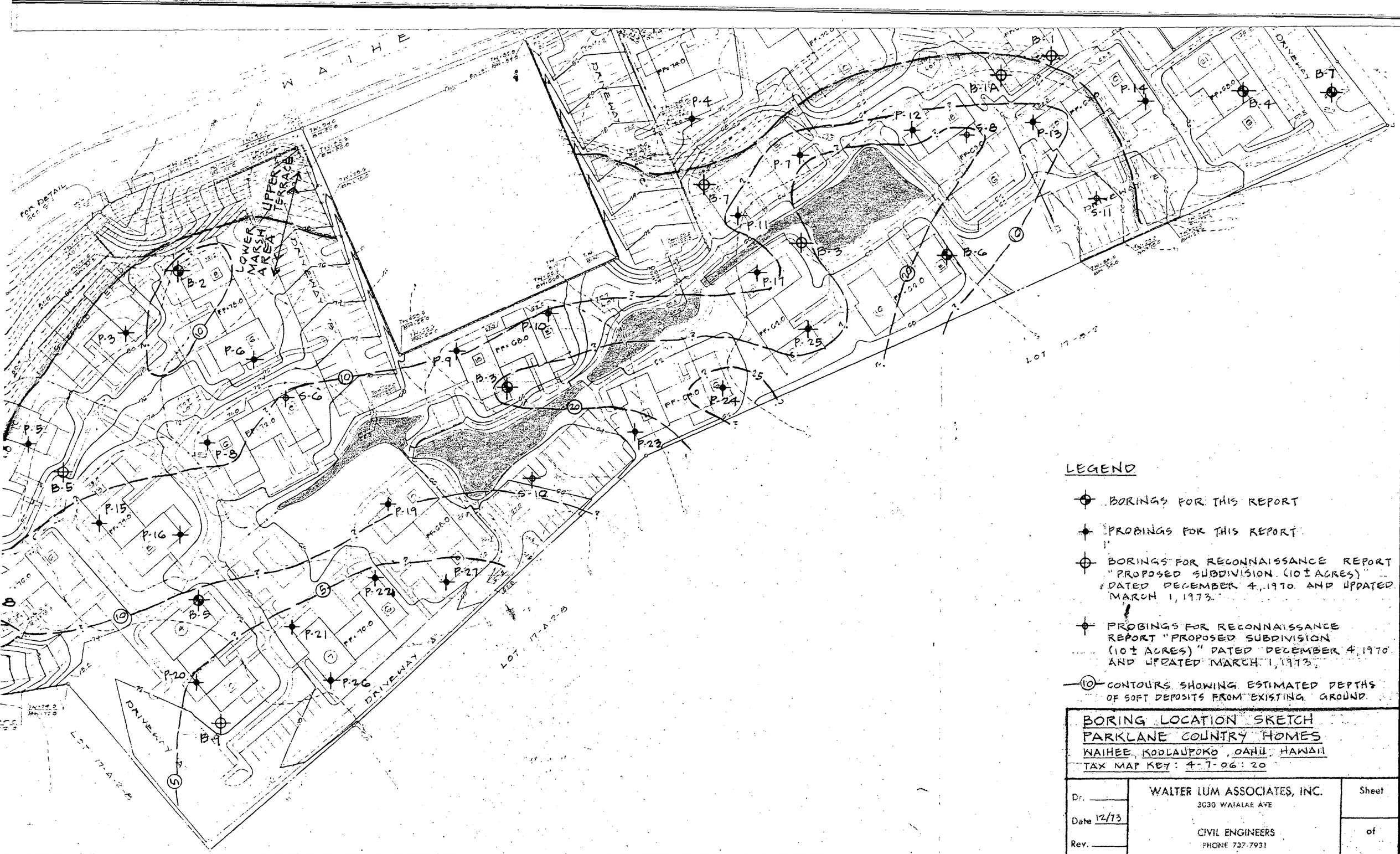
Type of Boring: CONTINUOUS PENETRATION Diam.: 2"

Elev.: ____ Datum: ____

Drill Bit: ____

| | | | | |
|---|---|---|---|---|
| Water Level | 0.7' ± | | | |
| Time | 9:45 AM | | | |
| Date | 11-23-70 | | | |

| Unified Soil Classification | DRILLERS DESCRIPTION | Depth (Ft.) | Sampler | Sample No. | Wet Dens. P.C.F. | Water Cont. % | Dry Dens. P.C.F. | Unconf. Comp. P.S.F. | Vane Shear P.S.F. | PENETRATION DATA: ~~Standard~~ CONTINUOUS Penetration Test, N (Blows per foot) 0 10 20 30 40 |
|---|---|---|---|---|---|---|---|---|---|---|
| | SOFT, ORGANIC CLAYEY SILT & ROOTS WATER | 0 | | | | | | | | HAND FLUSH/1.5' 8/.5' 10# SLEDGE HAMMER |
| | | 5 | | | | | | | | |
| | | 10 | | | | | | | | 43 |
| | END OF PENETRATION @ 12' | | | | | | | | | |




LEGEND

- BORINGS FOR THIS REPORT
- PROBINGS FOR THIS REPORT
- BORINGS FOR RECONNAISSANCE REPORT "PROPOSED SUBDIVISION (10± ACRES)" DATED DECEMBER 4, 1970 AND UPDATED MARCH 1, 1973.
- PROBINGS FOR RECONNAISSANCE REPORT "PROPOSED SUBDIVISION (10± ACRES)" DATED DECEMBER 4, 1970 AND UPDATED MARCH 1, 1973.
- (10) CONTOURS SHOWING ESTIMATED DEPTHS OF SOFT DEPOSITS FROM EXISTING GROUND

BORING LOCATION SKETCH
PARKLANE COUNTRY HOMES
WAIHEE, KOOLAUPOKO, OAHU, HAWAII
TAX MAP KEY: 4-7-06:20

| | | |
|---|---|---|
| Dr. | WALTER LUM ASSOCIATES, INC. | Sheet |
| Date 12/73 | 3030 WAIALAE AVE | |
| Rev. | CIVIL ENGINEERS | of |
| | PHONE 737-7931 | |


W A I H E E
LOWER MARSH AREA
UPPER TERRACE
FOR DETAIL SEE SHT
DRIVEWAY
DRIVEWAY
LOT 17-A-2-B
LOT 17-A-2-B
LOT 17-B-2
B-1
B-1A
B-2
B-3
B-4
B-5
B-6
B-7
B-9
P-1
P-2
P-3
P-4
P-5
P-6
P-7
P-8
P-9
P-10
P-11
P-12
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P-14
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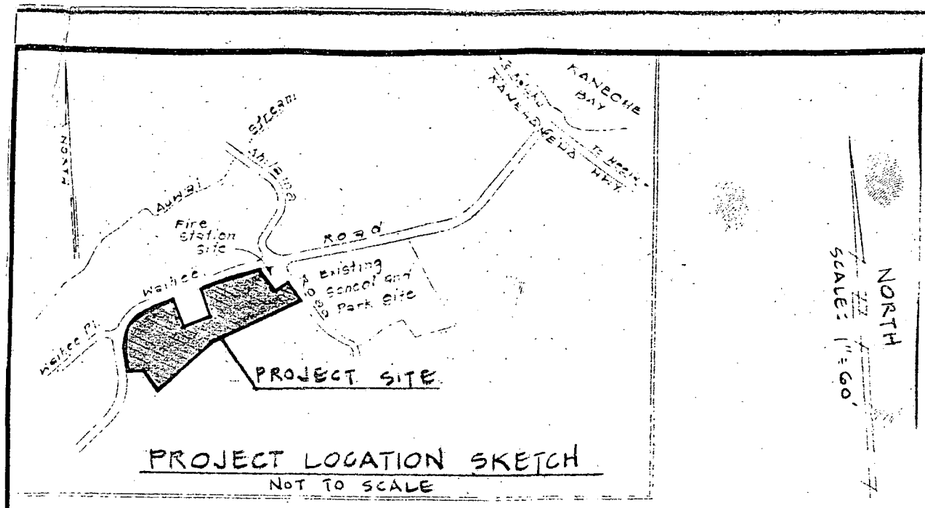
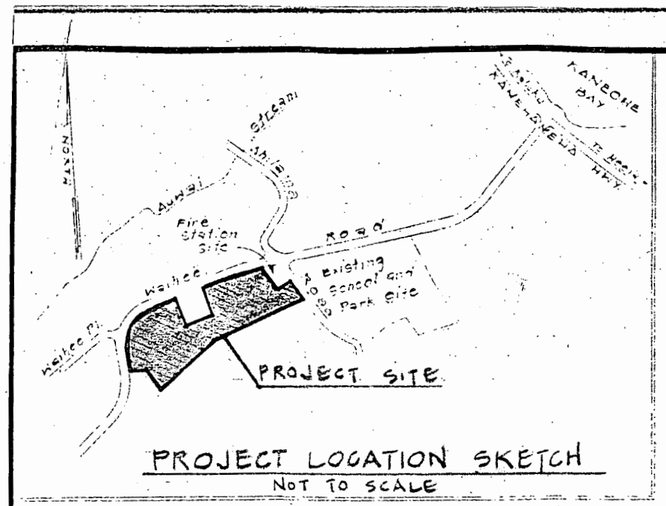
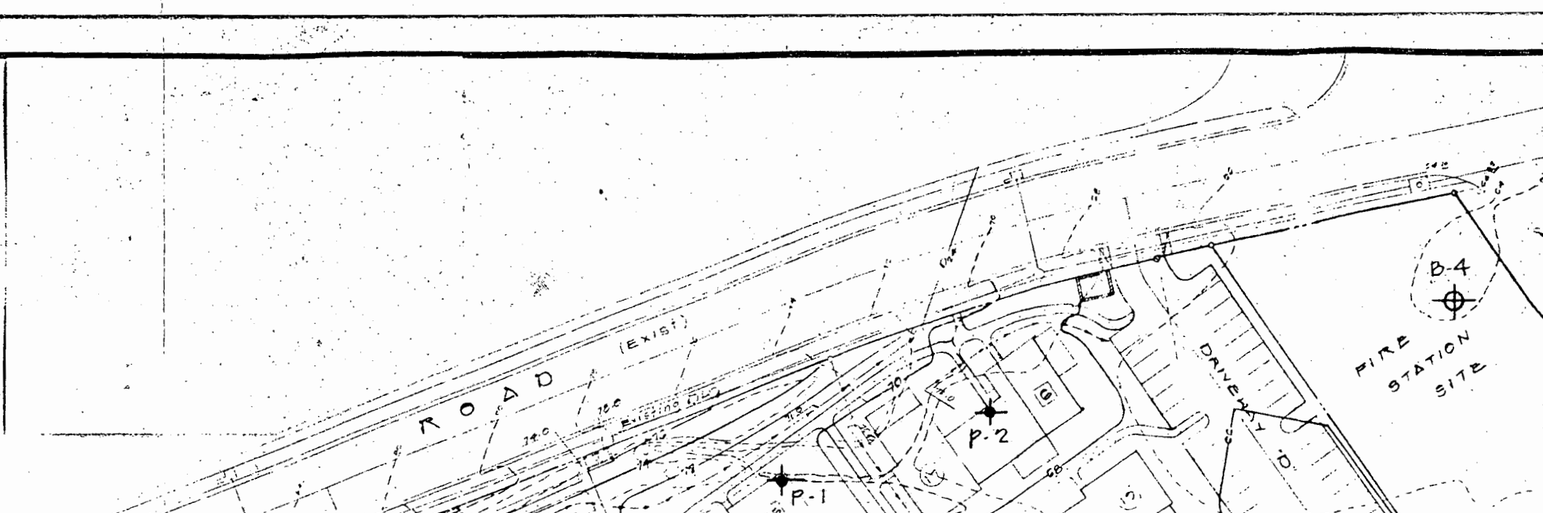
P-16
P-17
P-18
P-19
P-20
P-21
P-22
P-23
P-24
P-25
P-26
P-27
S-6
S-8
S-10
S-11
FF-78.0
FF-74.0
FF-72.0
FF-70.0
FF-68.0
FF-66.0
FF-64.0
FF-60.0
LEGEND
BORINGS FO
PROBINGS FO
BORINGS FOR
"PROPOSED
DATED DEC
MARCH 1, 19
PROBINGS F
REPORT "PRO
(10± ACRES)
AND UPDATE
CONTOURS SH
OF SOFT DEPOSI
BORING LOCA
PARKLANE C
WAIHEE, KOOLAUP
TAX MAP KEY: 4
Dr.
Date 12/73
Rev.
WALTER

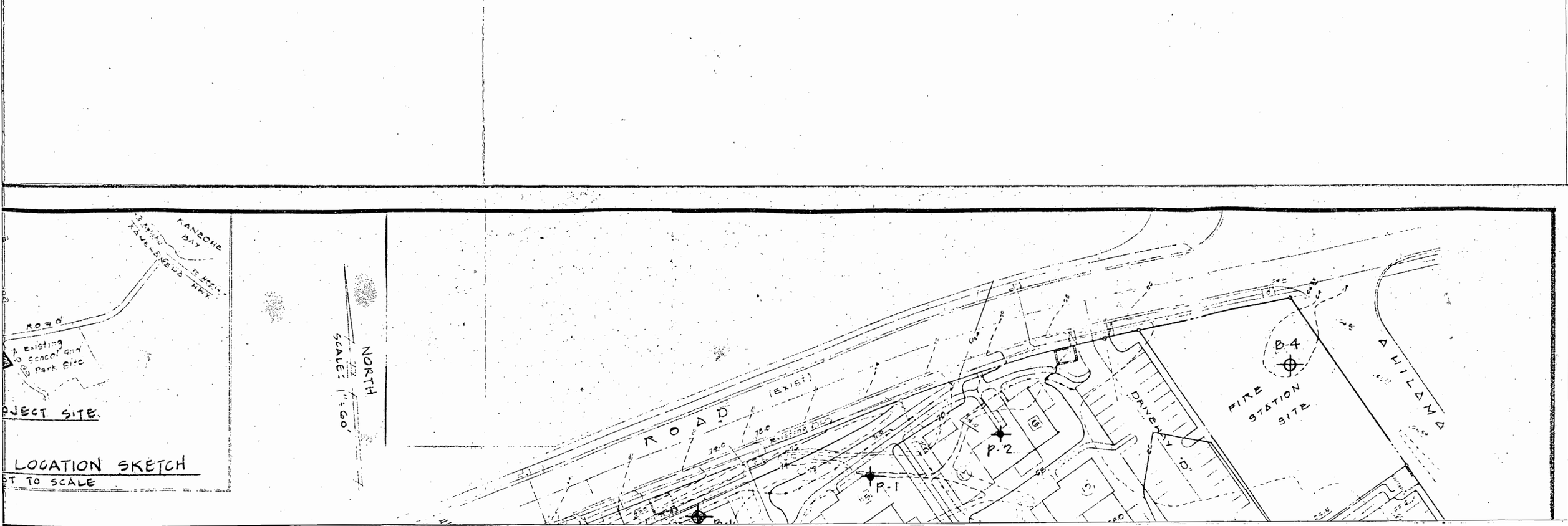

KANEOHE BAY
KAMEHAMEHA HWY
KAMEHAMEHA HWY
KAMEHAMEHA HW




PROJECT LOCATION SKETCH
NOT TO SCALE

NORTH
SCALE: 1"=60'




TANEOHE BAY
ROAD
Existing to School and Park Site
OJECT SITE
LOCATION SKETCH
OT TO SCALE
NORTH
SCALE: 1"=60'
ROAD (EXIST.)
Existing Bldg.
P-1
P-2
B-4
FIRE STATION SITE
DRIVEWAY
A HILAMA

## LIMITATIONS

In general, soil formations are commonly erratic and rarely uniform or regular. The boring logs indicate the approximate subsurface soil conditions encountered only at the drill holes where the borings were made at the times designated on the logs and may not represent conditions at other locations or at other dates. Soil conditions and water levels may change with the passage of time and construction methods or improvements at the site.

During construction, should subsurface conditions much different from those in the borings be observed, encountered, or otherwise indicated, we should be advised immediately to review or reconsider our recommendations in light of the new developments.

If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes, plan changes, or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the recommendations considering the time lapse, changed conditions, and changes in the state of the art of soil engineering.

Our professional services were performed, findings obtained and recommendations prepared in accordance with generally accepted engineering practices. This warranty is in lieu of all other warranties expressed or implied.